The Chemical Age

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The Work of the D.S.I.R.

THE twenty-third Report of the D.S.I.R., extracts from which appear on another page in this issue, contains the usual brief references to the almost staggering diversity of researches that industry has come to associate with the work of the Department. It can never be said that this country does not make the fullest use of scientific methods, even though we do not perhaps make so much display of our scientific work as do some nations. It is a characteristic of the Briton to get on with the job quietly without any particular fuss.

The methods of the D.S.I.R. are in many respects a model to all industrial research organisations, but a model that cannot be followed as completely as most chemists and physicists would desire. The D.S.I.R. and its constituent research organisations can afford to work thoroughly and investigate all phases of each subject; industrial organisations must quite frequently get rapid results sufficient to enable an immediate and pressing problem to be solved and thus cannot afford the time for exhaustive investigation. How often does an industrial research laboratory put aside an interesting investigation for future inquiry at some future date when there is more leisure—a date that generally never arrives! Data may be required for design of a plant for which a tender must be submitted at a definite date; or delivery of a chemical product may be held up by a works difficulty that must be solved forthwith, if losses are to be avoided. The procedure is different from that of a D.S.I.R. organisation and the outlook of the worker must be different. Nevertheless, each type of work is necessary, and industry in general must be profoundly thankful that there exist scientific men with time, opportunity and financial backing to engage in long-range research.

An excellent example of the thoroughness with which the D.S.I.R. does its work is afforded by the account given in the report of the activities in food investigation. The war, with its threat of world-wide food shortage, directed attention to the problem of cold storage, but almost immediately after the formation of the Food Investigation Board in 1917 it was found necessary to widen its terms of reference into: "To organise and control research into the preparation and preservation of food." Throughout all the work, the guiding principle has been the needs of the consumer. At the outset, three great problems had to be faced: The preservation of fruit, which responded badly to ordinary cold storage, the transport of beef over great distance in the light of the fact that frozen beef was unsatisfactory, and the handling of fish. The solutions have been found in the "gas-storage" of fruit—unknown 20 years ago; in the so-called "gas-storage" of beef, in which chilled beef is transported in a chamber having an atmosphere enriched with CO_2; and in brine-freezing fish.

These results have been secured by the full adherence to the policy laid down in an early report: "To carry the study of any problem as deeply as possible so that it might contribute its full quota to the body of fundamental science." A science of food storage and transport has thus been built up, slowly but surely. It was recognised that the problem was not one of engineering but of biology, and when the biological problems had been solved, chemical engineering was required to give effect to the discoveries of the biologists. In the same way, an investigation is being initiated now into the infestation of grain by insects, which is reputed to cost the country £500,000 annually. These are fundamental methods which may seem to operate slowly, but which probably give the quickest practical results ultimately.

Reference is again made to the financing of research associations, by offering block grants of so substantial an amount that with the contributions from industry upon which they are conditional, an income is assured adequate to develop a really effective organisation. The new plan has proved successful in that the total sum subscribed from industry now exceeds £250,000 a year, nearly a 40 per cent. increase on the sum subscribed before the scheme came into operation. There is no doubt that insofar as the research association scheme does not come up to complete expectations it is because there must be a large proportion of men in business who cannot fully appreciate the importance of the results obtained and are, therefore, slow to avail themselves of the valuable services provided by the research associations. Contributions by all the manufacturers in any one class of business to their own particular research association would enable that association to develop its work to the greatest extent and to be of still greater benefit.

> *. . . the urgent need is that we should look to our costs and see that they are reasonable and competitive. Further, we should continue the process of applying science and research to industry, which is being so much helped by the Committee of the Privy Council for Scientific and Industrial Research, and discover new methods of producing higher class goods.*
>
> —*Lord Riverdale.*

NOTES AND COMMENTS

Germany's Oil Production

PRELIMINARY figures for Germany's oil production in 1938 indicate the continuance of unremitting efforts made to render that country as independent as possible of foreign supplies. It is estimated that last year's production of crude oil rose by over 20 per cent. to more than ½ million tons, but it is realised that however far domestic sources are exploited they will never be sufficient to meet more than a fraction of the country's requirements. Thus the extraction of oil from coal, by hydrogenation and synthesis processes has been pushed forward and it is understood that the production of light motor fuels increased by 22 per cent. to nearly 1½ million tons. In normal circumstances this large increase would have been reflected in a decrease of imports, but owing to extensive military preparations in the autumn, the year's figures for oil imports actually show a gain over 1937. There can be little question that with the emergency stocks which must have been established and the growing production of oil from coal, the present year should show a very substantial decline in Germany's imports, assuming, of course, that further abnormal conditions do not arise.

Overseas Trade in January

WHILE there is nothing startling about the trade figures for the opening month of the year, they suggest that the slow improvement evident towards the end of last year has been continued. Thus exports at £39½ millions are down by £1¾ millions on a year ago, but up by £379,000 on January, 1937. Imports are valued at £75½ millions, a decrease of £9¼ millions on January, 1938, and a decrease of £143,000 on January, 1937. It must be admitted, however, that the trade in chemicals, drugs, dyes and colour cannot give much cause for satisfaction. Exports fell by £186,000 compared with January, 1938, and by £80,755 compared with January, 1937, while imports increased by £11,000 on the first month of last year. An analysis of last year's overseas trade classified by countries is included in the January returns and they bring out the interesting fact that our export trade with the Empire last year reached the highest figure ever attained.

Alcohol from Potatoes in Eire

LAST summer a lengthy inquiry was held into proposals under which the Potato Marketing Board would be empowered to produce ethyl alcohol and other chemical products from potatoes. The findings of the inquiry have not yet been published, but the latest information on the working of a similar scheme in Eire is interesting. The Canadian Trade Commissioner in Eire writing in the Canadian Commercial Intelligence Journal of January 28 last, states that the Industrial Alcohol Act of 1938 provided that a limited liability company should be formed, all of the capital of which should be subscribed by the Government. This step was taken as it was decided that the experimental stage in the manufacture of industrial alcohol from potatoes had passed. There are five alcohol factories at present in operation; they are equipped with most up-to-date machinery and use the Usines de Melle process of distillation. Each factory is capable of producing about 1,000 gallons of alcohol from potatoes per 24 hours. One factory has been equipped for using molasses as raw material during the off season, and it is intended to convert the others similarly in the near future. The company purchases all potatoes from the farmers at a fixed price. The price originally fixed had to be raised as it was found that deliveries were falling off owing to the farmer being able to get a better price in the open market. A salient feature of the project is that it is never likely to be profit-making but is a means of relief to impoverished potato-growers. Although the potatoes utilised are not limited to surplus supplies, and the Government in Eire states that it does not wish to show any profit, the fact that this large-scale production of alcohol from potatoes is uneconomic, provides a valuable experience.

Home Production of Raw Materials

DR. HERBERT LEVINSTEIN in an address to the Plastics Group of the Society of Chemical Industry last week, made some remarks concerning home production of raw materials which merit the widest possible publicity. Taking as his basis the requirements of the plastics industry, he pointed out that the essential materials common to a large group of industries were comparatively few in number and neither in peace nor in war could we be dependent for them on imported supplies. As an example of the way in which we import products we can make, thus depriving our people of employment and increasing our adverse balance of trade, he cited calcium carbide. The pros and cons of the home production of carbide must now be familiar to many, but Dr. Levinstein's forceful recapitulation of the position usefully re-draws attention to this extraordinary state of affairs. Carbide, by yielding acetylene directly and alcohol indirectly is thus a basic material for many industries and the raw materials for carbide manufacture are available in this country in unlimited capacity. But at present, Dr. Levinstein said, all our industrial alcohol is made from imported molasses. Referring to the fate of the Caledonian Power Bill scheme for carbide manufacture, he said that the battle of water power v. steam power as the source of the necessary electrical energy had sterilised action. (Actually, we believe, it was worse than that; the Bill was thrown out by Parliament mainly on the ground that erection of works near Inverness, as envisaged by the Bill, would spoil the scenery of the district.) Referring to the smaller scheme recently reported for making carbide in Flintshire, he expressed the opinion that it would be prudent to hasten the promotion of this scheme and to widen its scope.

A Fresh Committee for National Planning Overdue

OUR naturally occurring raw materials obtained from timber, agriculture, and coal, were not being best utilised, Dr. Levinstein emphasised. No use of petroleum products was being made except for burning, no use of coal or anthracite for making carbide; nor of our soil for agriculture and timber. He added: "I suggest to you that a fresh Committee for National Planning is long overdue. It must not only consult representatives of the Department of Scientific and Industrial Research and of the two or three big companies, invaluable as is their advice. An able financier and people who can speak with knowledge of the profession of chemical engineering and of the plastics industry, people who are not mere spokesmen but can think and act for themselves, should be made acquainted with the Government problems . . . A report on general lines but clear enough for action to be taken in many directions could be quickly made."

Science and Industry

Immense Field of Activities of the Department of Scientific and Industrial Research

THE annual report of the Department of Scientific and Industrial Research for the year 1937/38 (H.M. Stationery Office 3s. net) indicates the immense field covered by the activities of the Department and of the number of problems, the solution of which is being sought through the co-operation of science and industry.

The growth of the movement fostered by the Department to encourage the development of co-operative research associations in various industries, is strikingly illustrated by figures given in the report. These show that over a period of ten years the annual amount subscribed by industry for such co-operative research has more than doubled, having increased from just over £120,000 in 1929 to about £265,000 in 1937. Over twenty research associations are now functioning with the assistance of grants from the Department. During the year a new research association was formed. This is the British Coal Utilisation Research Association which has taken over the activities of the Research Department of the Combustion Appliance Makers' Association and is to develop research on the general problem of the utilisation of coal. As a result of the offers of grant assistance made by the Department, the Association will have a minimum income of £18,000 a year with a prospect of an annual income of £30,000 if full advantage is taken of the offer made.

The Growing Value of Research

The report of the Advisory Council makes an interesting statement on the value of research in industry and the research-association movement: "A review of the grant aid which is available for the industrial research associations has provided us with much encouraging evidence that the movement continues to make steady progress. But what we have found more encouraging even than the increased efficiency of the research associations has been the evidence of the growing value which industrial leaders set upon research. We do not forget that the research-association movement forms but a part of the research activity of industry, and our own particular interest in the association is coupled with a full appreciation of the true and very considerable worth of the many laboratories maintained by individual firms in industry, for we are convinced that the private laboratories and the research associations have complementary and equally vital contributions to make to the scientific well-being of industry."

Part of the work carried out during the year by the Fuel Research Board was the extension of the experiments on the use of coal instead of coke in water-gas plants to the use of higher volatile weakly-caking coals. It has also been possible by introducing iron ore into the preheating chamber of the water-gas plant to produce hydrogen, by the decomposition of some of the steam, in sufficient quantity to raise the hydrogen/carbon monoxide ratio of the water-gas made to a value suitable for direct use in the synthesis of liquid hydrocarbons.

The study of the hydrogenation of coal and tars to produce oils and motor spirit has continued. As regards coal the investigations have been directed towards obtaining greater knowledge of the factors which influence the course of the reaction, including the nature of the coal, the physical conditions such as temperature and pressure, and the nature of the catalysts employed.

A number of different tars have been examined as to the conditions in which they can most suitably be hydrogenated. The tars examined include coal tar from vertical retorts, tar from cannel coal, and tar or oil from Kimmeridge shale. The hydrogenation of a number of pure compounds has been studied to throw light on the course of the reactions, as has the possibility of producing diesel oil and lubricating oil from tars. One line of investigation consists in the cracking of hydrogenated tar with the view to obtaining gaseous olefines for subsequent polymerisation.

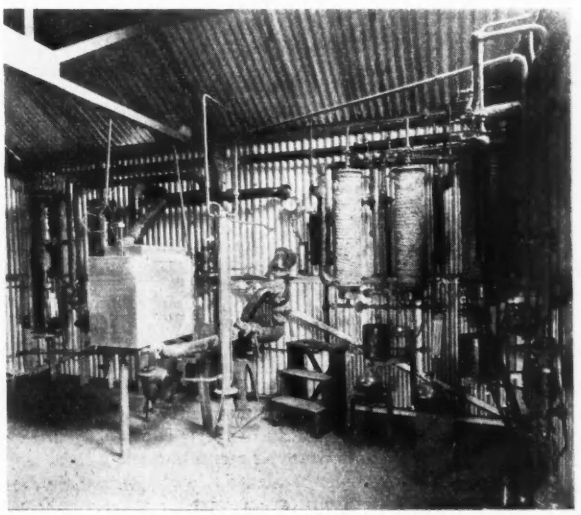
The synthesis of liquid hydrocarbons from carbon monoxide and hydrogen forms a means of production of oils from coal. The process takes place at atmospheric pressure, and has been studied in a plant capable of producing about 2 gallons of liquid product per day, as well as in smaller apparatus. The products consist almost entirely of straight-chain paraffins and olefines, from the simplest members of the series up to the wax melting at over 100° C. Fractions of the primary product may be used as motor spirit (but this has a rather low octane number) and as diesel oil which is of excellent quality on account of its high cetene number.

The olefines can be polymerised to produce lubricating oils, and sufficient quantities have been produced to enable laboratory tests of their quality to be carried out. They have not yet been produced in sufficient quantities for practical engine tests, and these are essential before a definite statement as to quality can be made. The laboratory tests indicate that the lubricating oil is of good quality.

Oils obtained by the polymerisation of unsaturated hydrocarbons from other sources are less satisfactory.

The wax obtained during the synthesis can be oxidised to form fatty acids, and soap has been produced from this source.

Investigations on road tar and the mechanical behaviour of tar-aggregate mixtures have been continued at the Chemical Research Laboratory and the Road Research Laboratory in co-operation with the British Road Tar Association. The losses and viscosity changes produced by vacuum distillation, by exposure in a dark thermostat, in a thermostat with intermittent ultra-violet light, and in the open have been compared, and it is shown that the changes produced in a dark thermostat can be duplicated by removing the same amount of oil by vacuum distillation. It is noteworthy that in these conditions the skin, or thickening of the surface tar, remains permeable to oil even after prolonged exposure. In the open there is an initial loss of oil, but after a short time a quiescent stage is reached during which no loss can be detected; moreover the viscosity in-



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View of semi-technical-scale hydrocarbon synthesis plant at the Fuel Research Station.

crease produced is greater than can be accounted for by the loss of oil observed. The application of ultra-violet light in artificial conditions tends to produce the same phenomena. It has been concluded that in addition to the effect of evaporation of oil in increasing the viscosity of tar exposed in the open, light and oxygen act upon the surface film, toughening it and rendering it impermeable to oils. These observations have an important bearing on the durability of tars in actual use.

Work of the Water Pollution Research Board

There are three types of base-exchange material on the market: (a) natural glauconites; (b) treated clays; and (c) synthetic products prepared from sodium aluminate and sodium silicate. It has been mentioned in previous reports that synthetic base-exchange materials for softening water are manufactured in this country but that the glauconites and treated clays are all imported. Earlier experiments showed that base-exchange materials suitable for softening water can be prepared from certain British clays by treating them with mineral acid, drying and baking at 550° to 600° C., and finally treating the baked material with solutions of sodium silicate and sodium aluminate (B.P. 434,663). It was found that by this method of treatment, using hydrochloric acid as the mineral acid, the yellow variety of Fuller's earth gives a product with a base-exchange value equal to that of imported treated clays; the product from yellow Fuller's earth is superior to most of the imported clays in that it is less liable to disintegration under usual conditions of water softening. Though manufacturers of water softeners have shown considerable interest in this discovery, the material from Fuller's earth is not yet in production on a large scale. In general, glauconites and synthetic base-exchange materials seem to be preferred, as they do not disintegrate so easily as most treated clays, and synthetic materials have higher base-exchange values. Further, during the last few years it has been found that base-exchange materials can be prepared from coals, and experiments at the Chemical Research Laboratory have led to the discovery that certain synthetic resins possess high base-exchange values.

Considerable progress has been made in the Department's investigation of the problems of treatment and disposal of the waste waters from milk collecting and distributing depots and from factories making cheese, butter, condensed milk and other milk products, and in the study of the physical, chemical and biological changes which occur in the purification of domestic sewage by the activated sludge process. During the past year the investigation on the estuary of the River Mersey and the chemical and biological survey of the River Tees have been completed (Water Pollution Research Technical Papers Nos. 7 and 6 respectively).

Chemical Research

A report describing in detail the work of the Chemistry Research Board for the triennial period to December 31, 1937, has been published.

A further study of the conversion of aliphatic alcohols into acids by high-pressure treatment with carbon monoxide in the presence of phosphoric acid has gone far towards elucidating the general principles underlying the process. Fermentation amyl alcohol (a mixture of *iso*-amyl alcohol and *sec.*-butylcarbinol) has been converted into a complex mixture of acids containing:—trimethylacetic (pivalic), 1, 1-dimethylbutyric, 1, 1-dimethylvaleric and 1-ethyl-1-methylbutyric acids. The nature of the acid mixture demonstrates the instability of the 5-carbon chain under the experimental conditions. No such instability is encountered in the 6-carbon chain, for 2-hexanol is smoothly converted into a mixture of 1, 1-dimethylvaleric and 1-ethyl-1-methylbutyric acids.

Condensations have been carried out with formaldehyde in alkaline solutions on ulmins from various sources, such as peat, lignite and oxidised coal. The products show improved base-exchange properties and increased mechanical strength as compared with the parent ulmins. The wax isolated by caustic soda treatment of ulmins has been identified as *n*-octacosane.

Further experiments on the hydrogenation of coal dispersed in oil (*J.S.C.I.*, 1938, *57*, 152) under conditions of turbulent flow have shown that 90 per cent. of the coal could be thus converted into heavy oil which was not readily hydrogenated further to volatile oil. Under similar conditions heavy tar acids were converted into low-boiling phenols with production of some neutral oil, but the further reduction of these more volatile phenols to neutral material proceeds only very slowly.

By catalytic hydrogenation, pyrene (*J. Chem. Soc.*, 1937, 1298) has been converted into a series of di-, tetra-, hexa-, and deca-hydropyrenes and by similar treatment homologous tetralins have been obtained from methyl-and di-methyl-naphthalenes. These tetralins have been employed in the synthesis of naphthacene derivatives.

Chemotherapy

An investigation of the condensation of picryl chloride with amines of the pyridine and quinoline series has been extended to the *iso*-quinoline and phenanthridine series, the most interesting feature of the work being the formation from these picryl derivatives by removal of the elements of nitrous acid of heterocyclic systems—1:3-*cyclic*-diazalines—which are not identical but isomeric with similarly substituted *a*-carboline ring systems (B.P. Application 185227/37).

In pursuance of the study of the trypanocidal activity of compounds of general formula $AsO_3H_2.C_6H_4.NH.CO.(CH_2)_n$, $CONR_1R_2$ the hexadecyl series ($n = 16$), undertaken for comparison with those in which $n = 0$ to 5, has been concluded with the preparation of free acid and ester as it has not been found possible to prepare amides in this series. (*J. Chem. Soc.* 1938, 442). A series of amides of general formula $AsO_3H_2.C_6H_4CH_2.CONR_1R_2$ has also been completed. Trypanocidal activity is maintained throughout this series (*ibid*, 471).

In pursuance of fundamental work on the course of aldehyde-phenolic condensations, determinations have been made of resinification times, particularly under acidic conditions (*J.S.C.I.*, 1938, *57*, 189) of the solubility of phenols in formalin (*Trans. Faraday Soc.*, 1938, *34*, 525) of rates of transformation of resins made from a variety of phenols, and of the yields of the various products of condensation. A permanently colourless resin has been obtained from methyl ethyl ketone-formaldehyde condensations by using all-glass apparatus under reduced pressure during the dehydration of methyl ketobutanol to *iso*-propenyl methyl ketone. Certain electrical and optical properties of the resin have been determined. (*Chem and Ind.*, 1938, *57*, 885). The changes in density, refractive index, molecular weight, and viscosity during formation of the polymeride have been used as the basis for a study of the mechanism of polymerisation.

The researches on the polypyridyls have been extended by the development of synthetic methods for the preparation and orientation of bases containing three, four, five, and six pyridine residues. These syntheses have been made possible by the production of mono- and di- bromine derivatives of 2:2′-di-pyridyl and 2:2′:2″-tripyridyl which result from vapour phase bromination of the foregoing bases at 500° C. Moreover, these bromine compounds have provided the starting point for the preparation of similarly constituted amines, nitriles, and carboxylic acids. Further progress has been made in a study of the complex derivatives of the foregoing polypyridyls with metallic salts, and part of this work has now been completed. (*J. Chem. Soc.*, 1937, 1649).

This year is notable for a greater output of technical publications than ever before in the history of the Research

Association of British Paint Colour and Varnish Manufacturers. Advances have been made in all sections of the research programme. The nature of paint is determined very largely by forces operating at the pigment/medium interface and the nature of adsorbed layers in this boundary region. Further, the later breakdown of the paint film is determined by the failure of these same forces to withstand conditions imposed by ageing of the gel structure of the film. Hitherto, the nature of the pigment/medium region has been largely a matter of conjecture, based at best upon circumstantial evidence, but the application of a special adsorption technique has provided new knowledge about these matters.

Problems Investigated at the Paint Research Station

The surface characteristics of pigment particles, their physical form, i.e., size and shape, crystal structure, surface cleanliness, and the like, are often much more important than their mass chemical composition, and these views explain why pigments, chemically similar or even identical, often behave differently when made into paints. As these physical properties are largely determined by the conditions prevailing during manufacture, an account has been written of the present state of knowledge of the fundamentals of precipitation and crystallisation processes. Practical work in this field has been commenced on the relationship between the physical form and surface, activity of pigments, their colour, and general performance value.

The studies in the mechanism of film-formation by drying oils and varnishes have recently been concerned with the role of oxygen. Methods have been developed for the determination of hydroxyl values (oxygen attached as hydroxyl groups) and peroxide values (oxygen attached as peroxides) of drying oils and related materials, and the main chemical reactions concerned in film-formation have now been identified. For completion of the picture, the exact nature of the accelerating function of metallic driers remains to be determined. The general nature of the chemical reactions between linseed oil and lead, cobalt and manganese compounds under various conditions has been determined, and the interrelationship between the metal complexes so formed and oxygen within the drying film is now receiving attention.

There has been considerable research activity on the degree and effect of solvent retention of lacquer films; although the major part of the solvent evaporates rapidly after application of the lacquer, small quantities may be retained in the film for long periods, with a marked effect on the physical properties. A technique of microscopic examination has been developed using stains, as in biological work, and chemical tests whereby it is generally possible to tell, by relatively simple means, the number and thickness of the several coats in a dried film, and in many cases to state that they definitely contain certain pigments of a particular type of medium.

Of the fundamental research carried out in the paint application field during the year, mention must be made of the potentiometric study of priming paints for iron and steel, which is part of the research programme on the general corrosion problem. It has been found possible, by an electrical method of examination of metal strips painted with various primers and immersed in corrosive liquids, to characterise the pigment present in the paint as stimulative or indifferent to the corrosion of the metal. The full possibilities of the method have not yet been explored, but after a test lasting only a few hours, predictions may be made of the probable course of corrosion and the extent of protection likely to be afforded by the paint.

The extensions to the British Cotton Industry Research Association mentioned in the last report were completed in the spring of 1938. It is hoped that the new machinery will enable the association to investigate completely many problems which have so far been shelved since they could not be carried to a complete solution by laboratory methods alone. The machinery now installed covers among other things scouring, bleaching, dyeing, stentering, and calendering and is already in constant use testing out, on the works scale, results obtained from fundamental work in the laboratory. An investigation of problems associated with the retention of size during finishing is only one of the directions in which the new machinery is proving its usefulness.

Mention has frequently been made in previous reports of attempts to increase the financial support given to the Wool Industries Research Association. The revised basis of subscription, which was stated to be under discussion at the time of the last report, has now been accepted by the various sections of the industry and should result in a considerably increased and more stable industrial income. As a result of the increased resources, it will be possible to accelerate progress in several directions.

Development work and further research on the production of shrinkage-resistant wool has continued to absorb a large proportion of the energies of the chemical staff. Commercial working of the association's chlorination process is now starting and a Certification Trade Mark (Woolindras) has been registered for the purpose of controlling and preserving the new standard of unshrinkability now attainable in wool goods which are placed on the market. An entirely new type of reaction which produces shrinkage-resistance in wool has also been under investigation, for which a patent application has been made. This consists in the use of certain proteolytic enzymes of the type of papain, whose activity can be controlled chemically and which appear to have specific action on certain regions of the wool fibre.

One of the most recent developments in the technology of rubber involves the subjection of the raw material to chemical treatments with the object either of slightly modifying its properties to facilitate its use in ordinary manufacture, or of producing entirely new derivatives. Progress in this promising new field for extending the use of rubber would be facilitated were the raw material available in a finely-divided condition adapted to chemical treatment. As an outcome of work carried out by the Research Association of British Rubber Manufacturers a method has been discovered by which the ordinary dry raw rubber of commerce can be reduced to a fine granular condition by a simple process requiring no special machinery beyond that ordinarily used in rubber manufacture.

If the resistance to heat could be improved without impairing the electrical properties, the practical value of ebonite as an insulating material would be greatly enhanced. This problem has engaged the attention of the association for some time, and promising results have been obtained by the use of certain types of siliceous "fillers" incorporated in the ebonite. This work, which is still in progress, promises to widen the field of utility of ebonite, a material that has been seriously challenged, and in some cases displaced, by the new synthetic plastics.

NEW CELLULOSE SOLVENTS

The Society of Chemical Industry in Basle describe a new series of solvents for cellulose in French Patent 820,556. They are the oxides of tertiary amines, notably trimethylamine, triethylamine, tripropylamine, monomethyldiethylamine, and dimethylcyclohexylamine. For example, if seven parts of cotton linters are mixed with 93 parts of trimethylamine oxide and heated to about 50° to 70° C. while being thoroughly mixed, the linters will dissolve to produce a very viscous solution from which the cellulose can be regenerated by diluting the solution with water. Ten parts of regenerated cellulose can in the same way give a viscous solution in 90 parts of a mixture of the oxides of triethylamine and trimethylamine. Water or weakly acid solution is used to regenerate the cellulose.

THE newly formed Soc. de Produits Chimiques Ethyl-Kuhlmann has been registered with a capital of one million francs at 11 rue de la Baume, Paris. One of the principal activities in which this firm will engage is stated to be the manufacture of ethylene bromide.

Chemical Matters in Parliament

Import of Molasses

IN the House of Commons last week, Mr. R. Gibson asked the President of the Board of Trade what explanation he could give for the fact that only 464,000 hundredweights of molasses and invert sugar were landed at Greenock during the year 1936 as against 1,114.000 hundredweights in 1935 and 991,000 in 1937

Mr. Stanley: I understand that in 1936 the use in distilling of high test molasses, *i.e.*, molasses which contains a high proportion of sweetening matter and is therefore not required in such large quantities as ordinary molasses, was introduced at Greenock and that in 1937 the manufacture of power alcohol was commenced at a distillery near Greenock. These changes probably contributed respectively to a decline in the quantity of molasses imported at Greenock in 1936 as compared with 1935 and to an increase in the quantity imported there in 1937.

Land Fertility

Major Carver asked the Minister of Agriculture whether he could state the number of complaints which had been made to his Department regarding the difficulties in obtaining adequate quantities of lime and also the lime content of supplies furnished to buyers; and whether any remedial action is to be taken.

Sir R. Dorman-Smith replied that no such complaints had been received during the current season by his Department or by the Land Fertility Committee. Since the scheme came into operation some 140 cases have been brought to the notice of the committee where analyses under the Fertilisers and Feeding Stuffs Act, 1926, had shown that the calcium oxide content of samples of lime was less than that declared by the seller. In such cases the attention of the seller was drawn to the deficiency by the local authority concerned. In addition the committee had arranged for periodical inspections of the premises of all producers of lime approved under the scheme and for samples to be taken for analysis by the Government Chemist. In cases where analysis had revealed serious deficiencies representations had been made to the suppliers concerned which had resulted in some instances in reductions of approved prices.

Major Carver also asked whether, in view of the fact that the recent reduced output of steel had produced a certain shortage in the supplies of basic slag, consideration could be given to extending the range of fertilisers which could be subsidised under the Government scheme.

Sir R. Dorman-Smith stated, in reply, that he was aware that the position regarding supplies of basic slag was as stated by Major Carver. He was hopeful, however, that more basic slag might become available as a result of the anticipated increase of the output of steel. As regards extension of the Land Fertility Scheme he referred Major Carver to replies given on the subject on December 5.

Alcohol Production

In the House of Commons on Tuesday Mr. R. Gibson asked the Financial Secretary to the Treasury what quantity of alcohol was produced in Scotland during each of the last three years; how much, in each case, was produced as power alcohol; and what steps were taken to prevent the diversion of the latter to purposes other than the operation of internal combustion engines.

Captain Wallace replied that he assumed that the hon. Member had in mind industrial and power alcohol. To answer the first and second parts of the question would involve disclosing the business of a single distillery, which would be contrary to established practice. With regard to the third part, steps to prevent such diversion were unnecessary, as power alcohol was charged with duty under Section

(*Continued on foot of next column.*)

Determination of Dusting Power

Its Relation to Particle Size

THE dusting power of a substance and its relation to particle size has been studied by Andreasen (*Kolloid Zeitschrift*, 1939, *86*, 70-77. The dusting power of about forty different substances was determined by making a gravimetric estimation of the rate of settling of the powder in a box provided with trays on which the substance was allowed to settle and which were withdrawn at intervals and the amount of material collected upon each one weighed. From the plot of the weight of the powder settled out against settling time, a numerical value of the "dusting power" was obtained by noting the amount of substance still suspended at the end of six minutes, and reducing the figures obtained on the basis of the dusting power of lycopodium being 100. Typical figures obtained were:—Aluminium powder 66, coarse wood charcoal 85, fine 23; talc 57; zinc stearate 27; potato starch 27, wheat starch 6.5; slate 17; fine slate 5.5; coarse calomel 9.5, fine 0.7; titanium oxide 4.0; quartz sand 0.

From observations made on the falling powders, it was concluded that the highly dusting powders commence to fall in clumps which, when they reach a certain velocity break up into individual particles which remain suspended. Only those clumps which are too small to reach the required velocity escape the break-up and can settle out. This is particularly the case with powders of small particle size. Those substances whose particles fell vertically had very small dusting ability.

The most remarkable result of the investigation was the fact that "fine" ground material in all cases dusted less—and considerably less—than "coarse" material (comparing, of course, samples of the same substance in the two states of subdivision). Thus a flint was ground in a ball mill for 1, 3, 5 and 25 hours. The sample removed after one hour had the highest dusting value, while the 25-hour sample had the least. These samples, of course, contain both large and small particles. When the dusting powers of a series of monodisperse powders of the same material were determined, it was found that the value increased with decreasing particle size down to 10μ; after that it decreased very markedly. It must therefore be the material below 10μ in diameter that causes the reduction in dusting power of the "fine" substances. Removal of this fraction results in an elevation of the dusting power

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A FACTORY for the production of aluminium alloys is to be built at Nisko in the Sandomir region of Poland by a new company, Huta Aluminium S.A. (capital 7 million zloty), which will have the technical co-operation of the Aluminium Français.

(*Continued from preceding column.*)

3 of the Finance Act, 1938, whereas industrial alcohol bore no duty.

Oil from Coal

Mr. R. Morgan asked the Secretary for Mines (1) the approximate amount of light and heavy oils, respectively, produced from British coal during 1938; and how these amounts were divided between the various processes; and (2) the retained imports of refined motor spirit and heavy oils, respectively, in 1938, including quantities obtained from home refined crude.

Mr. Cross: I regret that the information asked for is not yet available.

Mr. Morgan also asked the Secretary for Mines the amounts of motor spirit and Diesel oil, respectively, produced from shale in the United Kingdom in 1938.

Mr. Cross: By courtesy of Scottish Oils, Ltd., I am able to inform the hon. Member that during 1938 the company produced about 7,000,000 gallons of motor spirit and about 15,000,000 gallons of Diesel oil.

The British Industries Fair, 1939

THE British Industries Fair opens on Monday next at Olympia and Earls Court, London, and at Castle Bromwich, Birmingham, and continues until March 3. Figures available at the moment show that it will be almost as big as last year's Fair, which was of record size. Actually, last year's figures for area allotted to exhibitors in the Birmingham Section have just been exceeded, but this is offset by a small decrease in the exhibiting space at Olympia. The latest statistics give the total number of exhibitors in all sections as 2,216 and the space allotted as 831,443 sq. ft.

The Chemical Section at Olympia, which is again under the auspices of the Association of British Chemical Manufacturers, is in the same position as last year, immediately inside the Addison Road entrance to the Fair. The Association has an office on Stand No. A643 in the Section, where literature will be distributed and inquiries answered as to sources of supply. The Association's main Directory of which the 1939 edition will be available, covers the main products of its members in six languages, namely, English, French, German, Italian, Spanish and Portuguese, while the special Directory of British Fine Chemicals gives details of the manufacturers of over 3,000 fine chemicals in general use. The main Directory includes a section on proprietary names and trade marks with illustrations. Information regarding the services rendered to the chemical industry by the Association of British Chemical Manufacturers will also be available, with samples of the Association's regular publications such as the Monthly Summary of Chemical Trade, the Safety Circulars and the Quarterly Safety Summary and the Index to Legislation affecting the Chemical Industry. There will also be available the latest edition of the Directory of the British Chemical Plant Manufacturers' Association and information will be given in regard to affiliated associations operated from the office of the parent Association, namely, the Association of Tar Distillers, the British Animal Medicine Makers' and Allied Traders' Association, the British Chemical Plant Manufacturers' Association, and the British Disinfectant Manufacturers' Association.

A Survey of the Exhibits to be Shown in the Chemical Section

Albright and Wilson, Ltd.

(STAND NO. A665.)

This firm are known the world over as the pioneer manufacturers of phosphorus and of its many compounds. Recently considerable effort has been directed towards finding new applications for their chemicals. The exhibit will represent some of the more important uses of these products in industry to-day.

Chemicals for the Bakery: Acid calcium phosphate, acid sodium pyrophosphate, tartaric acid.

The manufacture of tartaric acid has been removed from the works of the Scottish Chemical Co., Ltd., Greenock, to an entirely new and up to date plant at the Widnes works of Albright & Wilson, Ltd. The acid is of exceptionally good quality and prepared in the following forms—powder, crystal and granular saline.

Chemicals for Water Treatment: Sodium metaphosphate (Calgon), di-and tri-sodium phosphate.

A new development is the so-called "threshold" treatment, which consists in the use of very small quantities of Calgon to prevent the deposition of calcium carbonate caused by heating waters containing temporary hardness, or by the addition of small amounts of soda ash or caustic soda to such waters. This process may be applied to condenser cooling water, certain process waters and municipal supplies.

Chemicals for Detergents for Textile and Laundry Processes: for Bottle and Dish-Washing, and for Industrial and Domestic Purposes: Di- and tri-sodium phosphate, tetra-sodium pyrophosphate, sodium metaphosphate (Calgon), acid sodium phosphate.

Phosphates, particularly tri-sodium phosphate, are widely used in bottle-washing detergents, household and industrial cleansers, soap powders, etc. More interest has recently been shown in tetra-sodium pyrophosphate in the preparation of soap powders. This product possesses the useful property of preventing the formation of "lime scum" and thereby achieving whiter and better washing where hard water is used. Sodium acid phosphate has recently assumed importance in the new washing process introduced by the British Laundry Research Association. It is sold by Keith Piercy, Ltd., under the trade name Aspon.

Alginates in Foodstuffs—Cosmetics—Textiles.

The company have recently become interested in the production and development of pure forms of alginic acid and its salts. Under its trade name Manucol, sodium alginate is being successfully used for the preparation of medicinal and cosmetic jellies, as an ice-cream stabiliser, in the creaming of rubber latex and in the finishing of certain types of textile goods.

New Products and Developments.

During the last twelve months plant has been put down for the manufacture of alkyl phosphates. Tri-butyl, tri-ethyl and tri-methyl phosphates are now in regular production and are finding a place for themselves amidst the range of solvents and plasticisers available. Strontium salts are also comparatively new. The plant is amply sufficient to fulfil the current needs of the country and covers a wide range of salts.

A. Boake, Roberts and Co., Ltd.

(STAND NO. A626/641.)

There will be shown a wide and varied range of fine chemicals and essential oils, many of which the firm are the sole manufacturers. The most important recent introductions in intermediates are catechol and acetoacetanilide which are now produced in sufficient quantities and at a price to enable them to compete with the imported material. Other intermediates to be shown include ethyl acetoacetate and its homologues, ethyl sodio oxalacetate, azo-benzene, benzoic anhydride, butanilide, mono- and di-chlorhydrins, crotonaldehyde, paraldehyde, methyl bromide, propiophenone and butyl bromide.

A wide variety of solvents and plasticisers used chiefly in the manufacture of cellulose ester and cellulose ether lacquers, plastics, moulded products, printing inks and paints and varnishes will be on view. In particular should be mentioned ethyl, butyl and amyl acetates as solvents, tricresyl phosphate, dibutyl phthalate, and ethyl and butyl acetyl ricinoleates as plasticisers, Abrac ester gums, Abralac synthetic resins of the polyhydric alcohol-polybasic acid type and Brax (a new water soluble resin).

A varied range of metallic soaps guaranteed to contain a definite metal content will be shown. They are obtainable as fused or precipitated products. Attention is drawn to aluminium and calcium stearates in oil treatment, and for the preparation of greases and water-proofing materials. Cobalt, lead and manganese derivatives are shown for use as driers both as single metal or mixed driers with various metal contents.

A large number of emulsifying agents for both technical and cosmetic purposes will be exhibited; particular interest will no doubt be manifested in the Abracol range of emulsifiers for cosmetics. Pharmaceuticals, flavouring essences, food colours, food preservatives, chemicals for foodstuffs, and oleo resins will be shown and in terpeneless oils the company are now offering a number which have been prepared by a new process. A range of perfume bases, cosmetic materials and deodorants will be on show.

Various grades and strengths of phosphoric acid and phosphates for all purposes; sulphur dioxide and derivatives of sulphurous acid; saponines and tannic acid; fire extinguishing products; sulphonated oils; disinfectants and detergents; acetic acid and carbon black will complete the company's exhibit.

Boots Pure Drug Co., Ltd.

(STAND NO. A666.)

The central feature of the display of Boots Pure Drug Co., Ltd., will be a large glass screen indicating the various stages in the manufacture of fine chemicals from coal tar. Names of intermediate products appear on both sides of the screen and there are vases of fine chemicals on a shelf directly underneath the screen. Fine chemicals manufactured by the company include potassium permanganate, mandelic acid, dichloramine T, chloramine T, saccharin, aspirin, potassium iodide, chloroform, sulphanilamide, acriflavine, magnesium carbonate, and a range of bismuth salts.

Special medical products of interest are Hepastab No. 2, a highly concentrated sterile solution of the anti-anæmic factors of mammalian liver for intramuscular or intravenous injection in the treatment of pernicious anæmia; Gastomag (magnesium trisilicate) for the treatment of hyperacidity, gastric ulcers, and allied conditions; and Rusven (Russell's viper venom) a powerful blood coagulant for local application in the treatment of external bleeding.

The manufacture and testing of Insulin-Boots will be well illustrated by means of photographs and transparencies. It has been shown that a suspension of insulin with protamine and zinc has a much more prolonged action than insulin in diabetes Mellitus and Protamine Insulin (with Zinc) Suspension-Boots will be displayed on the stand together with charts showing the relative hypoglycæmic effect of protamine insulin (with zinc) suspension and insulin.

The British Drug Houses, Ltd.

(STAND NO. A647.)

As on previous occasions the exhibit will be representative of the wide range of the company's activities and includes examples of medicinal chemicals and pharmaceutical preparations, as well as chemicals for use in research and analysis, and apparatus for general scientific purposes.

A unique exhibit which is bound to arouse considerable interest is a specimen of crystalline vitamin A naphthoate, the production of which has been facilitated by the further development of the process of molecular distillation by the B.D.H., Ltd., and other companies. Among the pure vitamins exhibited which are of special interest in therapeutics will be specimens of crystalline vitamin D_2 (radiostol or calciferol), vitamin C (ascorbic acid) and nicotinic acid, which may be identical with the pellagra-preventive factor of the vitamin B_2 complex, and which has now been widely employed in the treatment of pellagra.

By far the most interesting exhibit in the hormones section this year will be the synthetic œstrogen $\alpha\beta$-diethylstilboestrol, which is marketed for therapeutic use under the name Stilbœstrol, B.D.H. A wide range of medicinal chemicals, vaccines, veterinary products and pharmaceutical preparations will be exhibited as well as examples from 5,000 organic and inorganic laboratory chemicals, including specimens of the 220 "AnalaR" chemicals conforming to specifications for purity published in the book of "AnalaR" standards for laboratory chemicals.

A touch of colour will again be provided by the section devoted to the colorimetric determination of pH and illustrating the use of the B.D.H. Comparator, B.D.H. Capillator and Lovibond Comparator, while the convenience with which colour can be assessed is demonstrated by the B.D.H. pattern Lovibond Tintometer, which is the standard instrument for colour matching, and by the B.D.H. Lovibond Nessleriser for colorimetric analysis.

The section devoted to indicators will be completed by adsorption indicators and oxidation-reduction indicators, and in this section are shown standard tablets of methylene blue for milk testing.

W. J. Bush and Co., Ltd.

(STAND NO. A620.)

W. J. Bush & Co., Ltd., will be showing all varieties of essential oils distilled in this country, such as lavender, peppermit, celery, caraway, dill, clover and nutmegs, etc., together with those produced in various parts of the Empire. Also on show will be a very large range of fine chemicals, pharmaceuticals and intermediates. Among the fine chemicals may be mentioned coumatin, vanilliin, heliotropine and propiophenone; among the pharmaceuticals—beta phenyl isopropylamine and its salts, sulphanilamide, salicyl ethyl carbonate, guaiacol and its carbonate, etc., while among the intermediates are the acetoacetic derivatives of aniline, toluidine, chlor- and dichloraniline and of anisidine. Floral ottos, soap perfumes, cosmetic and perfume bases and compounds, harmless food colours will also be shown, as well as fruit essences and pure fruit concentrates and juices.

The Gas Light and Coke Co.

(STAND NO. A610.)

This company's exhibit will consist of about 40 specimens of their range of tar, ammonia and cyanogen products. Chief amongst these are creosote for wood preservation and hydrogenation purposes, pitch for briquetting and various manufacturing purposes, and tars. Tar spirits to be shown include benzoles, toluoles, solvent naphthas, xyloles and heavy naphtha. A special grade of naphtha for disinfection purposes is included. Crystal phenol for use in the synthetic resin industry, and cresylic acids are of particular interest.

Naphthalenes range from drained, whizzed and pressed crudes, to purified crystal, powder, ball and flake forms. Pyridines cover 90/180, 90/160 and 90/140 grades, and pure qualities of narrow boiling ranges. Ammonia products include sulphate of ammonia and liquid ammonia for industrial purposes. There will be a colourful display of cyanogen products including prussiate of potash and a range of bronze blues. Among other products will be sulphuric acid and green copperas.

The General Chemical and Pharmaceutical Co., Ltd.

(STAND NO. A671.)

The General Chemical and Pharmaceutical Co., Ltd., will be exhibiting a range of analytical reagents supplied with labels showing the actual batch analysis of the material. This series of reagents is now marketed under the registered trade mark "Judactan." For the supply of Judactan analytical reagents a uniform type of amber bottle has been selected, the bottle being fitted with a well-designed moulded screw cap, with inert liner, which ensures an airtight seal when the cap is replaced.

Other exhibits of the General Chemical and Pharmaceutical Co., Ltd., will consist of Judex guaranteed analytical reagents, Judex indicators, absorption indicators and oxidation-reduction indicators, also organic reagents for "spot tests." The company offers a set of 30 tubes containing 1 gram each of the more important reagents in this latter class.

In the section of general fine chemicals an example will illustrate the work which the company has done in producing chemicals specially designed to assist the work of specific industries. Among the chemicals of industrial interest the company will show examples of Vulcan bright dipping acid (which contains a special economiser and regulator), Oasis accumulator acid and distilled water and Oasis potash electrolyte for use in nickel iron batteries.

Hopkin and Williams, Ltd.

(STAND NO. A668.)

The exhibition of AnalaR laboratory chemicals will again be a feature of Messrs. Hopkin & Williams' stand. The production of reagents under this registered name is entirely in the hands of the two concerns Hopkin & Williams, Ltd., and

The British Drug Houses. The standards agreed by the two companies are published in "AnalaR Standards for Laboratory Chemicals." Hopkin & Williams' AnalaR chemicals are packed in a distinctive type of bottle with moulded screw cap, an ideal closure both for protection of the reagent and for convenience in handling.

With the increasing importance of micro-analytical methods the company has produced a series of micro analytical reagents, the purities of which are in accordance with the standards described by Pregl and other workers.

Another class of Hopkin & Williams' products will be accompanied by appropriate literature. "Organic Reagents for Metals" in its third and much enlarged edition describes the use of thirty-eight reagents and moreover, a comprehensive bibliography relating to each reagent is included. A number of organic reagents have been made available since the publication of this monograph, two of which might be mentioned; resacetophenone (dihydroxyacetophenone) a reagent for iron, and dimercaptothio-diazole a reagent for bismuth which has subsequently been recommended for the determination of lead tetraethyl in petrols.

Indicators will be prominently displayed on this stand. In addition to oxidation-reduction, pH and adsorption indicators, a new group is displayed for the first time, namely, fluorescent indicators. These last-named are particularly recommended for the determination of acidity or alkalinity of strongly coloured solutions which inhibit the use of visual indicators. Furthermore, in the past the only method of titration of such strongly coloured solutions has been potentiometrically; fluorescent indicators enable the potentiometric equipment to be dispensed with and permit direct titration. Among such indicators available for the first time, 3:6 dihydroxyphthalimide, 3:6 dihydroxy-phthalonitrile and β-methyl-umbelliferone are worthy of note. An ultra-violet lamp will be on the stand enabling the elegance of these indicators to be demonstrated.

The use of ceric sulphate as a volumetric solution has long been recognised, but its utility has been offset, in the past, by the time and trouble required to prepare the solution. Hopkin & Williams, Ltd., have now produced a pure ceric ammonium sulphate which is readily soluble in cold dilute sulphuric acid. Other new products include edestine, and a fluorescent cadmium tungstate.

Howards and Sons, Ltd.

(STAND NO. A648.)

Howards of Ilford will be showing on their stand this year their Nilox Ester Oil Sr., which was evolved primarily for the worsted industry, but also for the rayon industry, as an oil superior to the best olive oil in performance, and having the additional advantages of uniform quality and stable price. It is a synthetic oil manufactured under carefully controlled conditions, and is free from mineral oil. This oil is free from any tendency to oxidise and does not cause rancidity. Howards' sodium lactate (technical 80 per cent.) has made great strides during the last year as a glycerine alternative, particularly in calico printing. It is also proving most useful in the finishing of various classes of textiles and as a plasticiser for casein. Their Diterpene is a most interesting product, especially for manufacturers of synthetic resin finishes and inks. This very high-boiling, pale yellow, practically odourless, viscous liquid dries by oxidation to give tough films; it is 100 per cent. film forming and loses no weight on drying. On account of these properties it is useful as an anti-skinning agent in certain types of inks; and also for promoting flow in high-temperature stoving lacquers, which are prone to ripple badly.

For use in the cellulose and synthetic resin lacquer trade, Howards have now put on the market two plasticisers, which have been manufactured for the first time on the large scale. These white crystalline plasticisers are of a very high degree of purity, and also available at a much lower price than hitherto. This firm will also be demonstrating the uses of their well-established solvents and plasticisers for the lacquer, paint, plastics, leather, textile, etc., trades.

Imperial Chemical Industries, Ltd.

(STAND NO. A627/40.)

This year's main I.C.I. stand in the chemical section will follow the policy introduced last year of showing one major product at a time. Last year the subject was soda; this year it will be ammonia. Exhibits will fall into six main groups: the uses of ammonia in its anhydrous form; as ammonia liquor; as ammonium compounds; oxidised to nitric acid; converted to cyanide; and converted to urea.

Some of the uses of ammonia in its anhydrous form will be suggested by displays dealing with water sterilisation, the preparation of rubber latex, refrigeration and metal production. Ideas on the uses of ammonia liquor will be conveyed by reference to the manufacture of cuprammonium silk, to toilet ammonia preparations and to laundry and textile processes. Ammonium compounds to be illustrated will include those used in dry batteries, fireproofing chemicals, baking and galvanising. One section will show how derivatives of nitric acid—itself produced by the oxidation of ammonia—are used in the preparation of anæsthetics, in the manufacture of glass, enamel, paint and industrial explosives; in the curing of meat and bacon, and in the dyeing industry. The two remaining groups will deal with some of the uses of ammonia converted to cyanide—HCN fumigation, gold extraction and casehardening—and of ammonia as urea in the manufacture of plastics and in the pharmaceutical trade.

Johnson and Sons, Manufacturing Chemists, Ltd.

(STAND NO. A621.)

This company will be displaying on their stand a complete range of fine chemicals as used in photography including Metol, Amidol, acid pyrogallic, hydroquinome, chlorquinol, glycin, Meritol, as well as other compounds made to specific formulæ and packed in convenient sizes for use.

A feature of the exhibit, and one of particular interest to the photographic trade in these days, will be the range of fine grain developers in various forms. Most of this series have Meritol included in the formula. There will also be a range of "Scales Brand" fine chemicals and a few of the company's special pharmaceutical preparations.

Monsanto Chemicals, Ltd.

(STAND NO. A625, A642.)

The general lines of this exhibit will maintain the company's previous policy of showing their products in certain well-defined sections devoted to particular classes of chemicals. Prominence will, as usual, be given to the display of phenols and cresols. A comprehensive range of these phenolic and cresylic acids is shown, together with pure toluole, naphthalene and similar coal tar isolates.

As a natural development from these heavy chemicals, there will follow a section devoted to the series of disinfectants and germicides which Monsanto Chemicals, Ltd., are offering. These range from products of the sheep-dip type to specialised germicides such as the chlorinated phenols. Included in this section are the Santaxate and Cresantol 208 which the company feature as powerful preservatives. The comprehensive range of chemicals for the rubber industry will again be a notable feature and several new accelerators have been added to the already lengthy list of these products offered.

The fine chemicals which will form the remainder of the display will include aspirin and associated salicylates, and phenacetin (of which the company are the only British manufacturers). The confectionery trade will be interested in the exhibits of vanillin and Ethavan. Under this section also will be shown products of particular interest to the paint, lacquer and varnish industries as well as to the plastics industry centred round the cellulose derivatives. The basic material in this sub-section is phthalic anhydride, displayed in the form of white flakes. Phthalic acid is also being offered in addition to the more normal anhydride. Typical developments from phthalic anhydride are the series of

phthalic ester plasticisers. A further development from phthalic anhydride in another direction is the display of benzoic acid and sodium benzoate, of interest to the pharmaceutical world, the manufacturers of preserved food products and also, somewhat unexpectedly, the paint trade whose use of benzoic acid as a thixotropic agent is steadily increasing.

South Metropolitan Gas Co.

(STAND NO. A611.)

Metro coal tar and ammonia products resulting from the purification of coal gas and the distillation of coal gas tar will be shown on this stand. Visitors will notice the modern gas lighting in and around the Metro exhibit, which will no doubt help to draw attention to the display of products.

The Metro chemical products to be shown include dry neutral sulphate of ammonia which can be stored for long periods without changing. Its content is as much as 25.71 per cent. ammonia—equal to 21.14 per cent. nitrogen. Metro disinfectant fluid for general purposes (now having an increased coefficient of 11 at no increase in price); black varnish and Metrotect for protective treatment of outdoor ironwork; Metro creosote for preserving outdoor woodwork; solid smokeless fuels; motor benzole; anthracene; sharp oil; pyridine; sulphuric acid; sulphate of iron; coal tar pitch, etc., complete the exhibit.

Spencer Chapman and Messel, Ltd.

(STAND NO. A644.)

This firm will be showing samples of their well-known acids including oleum, 20 per cent., 40 per cent., 60 per cent. and 80 per cent.; battery acid; hydrochloric acid, pure and commercial; nitric acid, pure and commercial; sulphuric acid, pure and commercial; and sulphur trioxide.

Thomas Tyrer and Co., Ltd.

(STAND NO. A624.)

This company will show numerous examples typical of their extensive range of fine and technical chemicals. There will be on view a representative selection of inorganic chemicals conforming in purity to the specifications of the British Pharmacopœia and the British Pharmacopœia Codex; of these mention may be made of samples of bismuth salts, scale preparations, citrates of soda and potash and a varied range of the regular requirements for the pharmaceutical trade.

Of technical chemicals the firm will be exhibiting various samples of standardised products of their manufacture which are in regular use in the paint, rubber, photographic, cosmetic, etc., industries.

Whiffen and Sons, Ltd.

(STAND NO. A667.)

Whiffen and Sons, Ltd., will be showing several recently introduced preparations of which the following are notes. Since nicotinic acid was exhibited at the British Industries Fair of 1938, both its production and therapeutic application have considerably developed. Its position as a dietary essential has been conclusively proved and no treatment of pellagra to-day would be considered without it. It is a white solid, soluble in water and with melting point 233° C.; it is therefore perfectly stable at all biological temperatures. Di-iodoform—more correctly named ethylene tetraiodide—is a pale yellow, odourless crystal which is used as a substitute for iodoform or as a 5 per cent. ointment in tubercular and similar affections.

The Sozoiodole compounds are salts of di-iodo-*p*-phenol-sulphonic acid and are powerful antiseptic compounds. They are usually easily soluble in water, colourless and can be extensively employed as dusting powders. In solution they furnish excellent irrigants. N-butyl bromide, n-propyl bromide and isopropyl bromide are important esters which have been added to the firm's series of bromine derivatives. They can be conveniently used in synthesis for the introduction of these alkyl groups and are fairly heavy, refractive liquids, all with boiling point up to about 100° C.

Outstanding amongst antiseptics to-day are the phenylmercuric compounds of which the chloride, the nitrate and acetate are the most widely used. They have proved of inestimable value in gynæcology and also in the treatment of parasitic diseases. Ethylmercuric chloride is extensively used in seed-dressing and also as a preservative in the lumber trade. Tribromophenol occurs in the form of crystalline needles, almost insoluble in water. It is a powerful antiseptic and as it is insoluble in the gastric juice can be used effectively as an intestinal disinfectant. Naturit is a complete and natural manure manufactured from entirely organic materials. This ensures that the nitrogen, phosphates and potash required by the plant are in a form where the full fertilising benefit will be obtained. In addition, Naturit contains a high proportion of that essential humus which keeps the soil properly aerated and humid so that the plant can assimilate its food. It contains and continuously encourages the growth of such bacteria as *Azotobacter, Nitrosomonas, Nitrobacter and Clostridium Pastorianum.*

Williams (Hounslow), Ltd.

(STAND NO. A622.)

As in previous years this company will be showing dyes for all types of leather, either for staining or for dyeing in the drum, as well as colours for synthetic resins, cellulose lacquers, oil and spirit varnishes, inks, wood-stains, soaps, candles, etc. Nigrosine (spirit, water and fat soluble) and nigrosine base will be well to the fore; induline base and the Typogen dyes, as used in the printing ink industry, will also be on view, together with a wide range of oil soluble dyes corresponding to the German Sudan series.

There will also be a display representative of the harmless confectionery colours which are supplied under a special guarantee of purity. These will include the newer colours such as Sunset Yellow FCF., Brilliant Blue FCF. and Ponceau SX.

It is intended to publish in next week's issue further notes on the exhibits at Olympia and a description of exhibits of interest at the Castle Bromwich, Birmingham, section of the Fair.

Aluminium in Aluminium Powder

New Method of Determining Pure Metal Present

A NEW method for the determination of metallic aluminium in aluminium powder for leafing paints is described by A. Mankowich in the *Chemist-Analyst, 27,* 62. It was found that reduction of ferric sulphate by aluminium in hot sulphuric acid solution was unreliable, and that such methods as the volatilisation of the aluminium as chloride, or the weighing of the water formed from hydrogen evolved by aluminium dissolving in caustic soda solution, were too involved to be generally suitable for use. In the present method the iron, silicon, copper, zinc and manganese impurities are determined by standard methods, followed by the determination of fatty matter by extracting 2 grams of the powder with acetone for 16 hours, evaporating the solvent and drying the fatty residue at 100° C. for 30 minutes. Total aluminium was determined by dissolving 0.1 gram of the sample in 10 c.c. of a mixture of 15 per cent. sulphuric acid, 30 per cent. hydrochloric acid and 10 per cent. nitric acid, precipitating with ammonium hydroxide and weighing. A correction being made for the ferric oxide content of the alumina at this stage of the work, the metallic aluminium content is obtained by subtracting from 100 the sum of the impurities and total aluminium. This gives the oxygen and consequently the alumina content of the sample. The true metallic aluminium content is then obtained by subtracting the aluminium (as Al_2O) from the total aluminium content as determined.

British Standards for Paint Materials

Work of Revision Now Completed

THE British Standards Institution have issued revisions of the specifications for paint materials B.S. Nos. 282, 388 and 390. The work of revising the series of British Standards for Paint Materials, a task which was commenced in 1932 and involved the review of some 70 specifications, has now been completed. The following are the principal points of interest with regard to the revision of the three specifications :—

B.S. 282 Lead Chrome: The references to specific shades have been deleted and the limit for aluminium compounds present in the primrose shades has been reduced from 7½ per cent. to 4 per cent.

B.S. 388 Aluminium Powder and Paste: The minimum permissible aluminium content in the powder has been reduced from 97 per cent. to 95 per cent. The maximum permissible grease content has been increased from 2.5 per cent. to 3.0 per cent. In view of the increasing use of aluminium in paste form a further specification has been included to provide for paste made from aluminium powder and white spirit, the qualities of both of which are laid down in the appropriate British Standards.

B.S. 390 Oil Pastes: This specification has now been so drafted as to cover all forms of oil pastes other than white lead, zinc oxide and lithopone. The separate specifications have accordingly been withdrawn. The ingredients are all specified by reference to the appropriate British Standards.

A SIMPLE TEST FOR METHYLCELLULOSE

A simple test for methylcellulose when mixed with other types of cellulose has been suggested by two German chemists, Brauckmeyer and Buhl. A small sample of the material to be tested is put under a microscope and moistened with a drop of 0.05 per cent. solution of Sirius blue G, Sirius blue 6G, or diamine blue FF. Within about half a minute the methylcellulose will absorb nearly all the colour and take on a tone about comparable to that of starch when used in a positive iodine test.

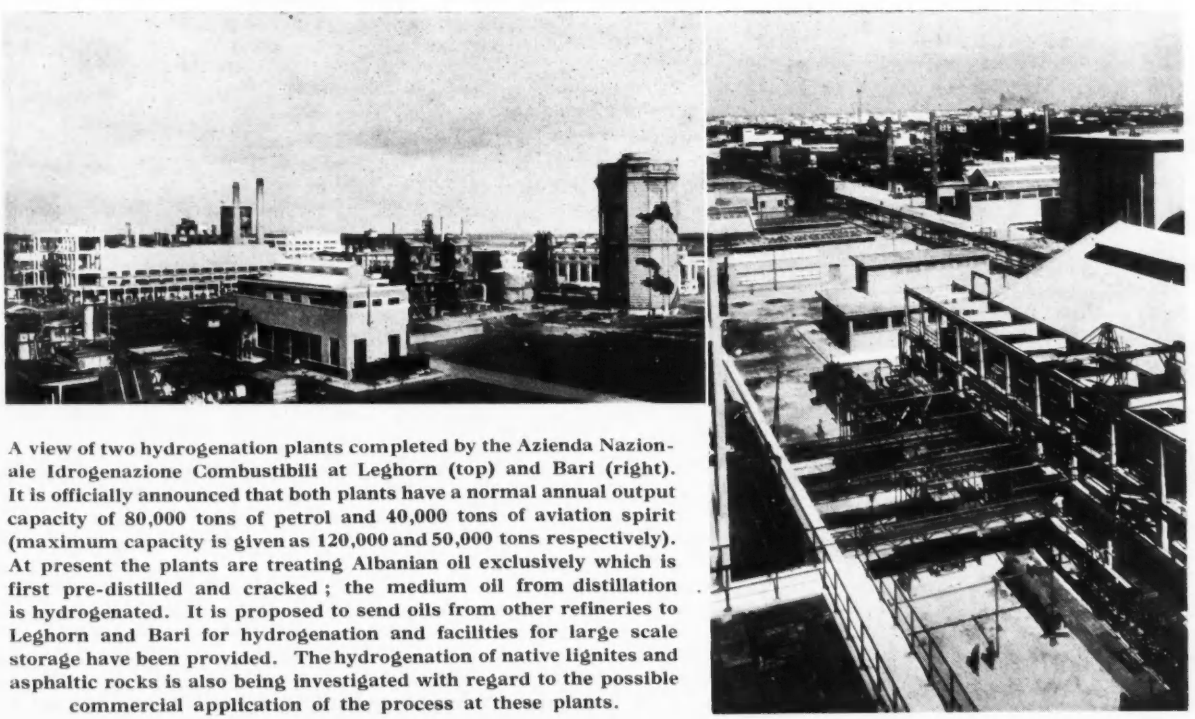
Impurities in Fuel and Flue Gases

A New Method for Removing Nitric Oxide and Sulphur

THE removal of nitric oxide and sulphur compounds from combustible gases and waste flue gases, as described in a patent to The Gas Light and Coke Co. and W. R. Dudden (B.P. 496,721), just published, appears to offer promise of adoption in different aspects of the chemical industry, as it has analytical as well as gas purifying applications. The basic principle of the process is to bring the gas into contact with nascent oxygen as evolved at the anode of an electrolytic cell. Preferably the cell is operated at a potential not greater than 5 volts, with the gas passing the anode at atmospheric temperature and pressure.

In its analytical application the process may be used for the quantitative determination of nitric oxide present in small quantities in coal gas or other combustible gases, the nitric oxide being oxidised to nitrogen peroxide which is then determined by use of Griess reagent. Oxidation is effected by passing the gas over a platinum anode with dilute sulphuric acid as the electrolyte. Over a large series of determinations on gas containing from 0.1 to 4 parts per million of nitric oxide, the results showed deviations within 5 per cent. of the correct figure. Where the gas contains a larger amount of sulphuretted hydrogen, it is necessary to remove this by washing the crude gas with caustic soda before passing to the electrolytic cell. If large quantities of ammonia are present this should be removed or reduced by washing with acid.

Using the process for the removal of nitric oxide from coal gas or other combustible gases, a lead anode and sulphuric acid are preferable. Here the nitric oxide appears to combine with the lead of the anode and the active oxygen to form lead nitrate, which then reacts with the sulphuric acid to give nitric acid and a coating of lead sulphate on the anode. It is stated that almost complete removal of the nitric oxide can be effected. With a current of 0.3 amp. at a potential of 3 volts it was found possible to reduce the nitric oxide in a gas from 0.5 parts per million to 0.05 parts per million, about 25 per cent. of the nitric oxide being converted to nitrogen peroxide and the remainder to nitric acid. A similar process can be used for reducing the sulphur content of gases



A view of two hydrogenation plants completed by the Azienda Nazionale Idrogenazione Combustibili at Leghorn (top) and Bari (right). It is officially announced that both plants have a normal annual output capacity of 80,000 tons of petrol and 40,000 tons of aviation spirit (maximum capacity is given as 120,000 and 50,000 tons respectively). At present the plants are treating Albanian oil exclusively which is first pre-distilled and cracked; the medium oil from distillation is hydrogenated. It is proposed to send oils from other refineries to Leghorn and Bari for hydrogenation and facilities for large scale storage have been provided. The hydrogenation of native lignites and asphaltic rocks is also being investigated with regard to the possible commercial application of the process at these plants.

The Dimensions of Organic Molecules

Information given by X-ray Crystallography

THE 44th Bedson Lecture delivered by Dr. B. Monteath Robertson at King's College, Newcastle-upon-Tyne, on January 27, was entitled "The Dimensions of Some Organic Molecules." Dr. Robertson dealt with advances in this field, which have occurred, mainly as a result of X-ray crystallography. A crystal may be regarded as a periodic structure of units containing electrons, which diffract X-rays, and from a consideration of the direction of diffracted beams, it is possible to determine the distance between these units. By a more involved analysis of the intensities of the beams something may be learnt about the distribution of the electrons within the diffracting units, and from this, the structure of organic molecules can be investigated. The results are worked out as a two dimensional graph of electron density, and although in general there is foreshortening owing to the molecule lying at an angle to the plane of projection, it is possible, by taking a series of projections, to obtain a true picture of the molecule in space. Upon such graphs atoms, except hydrogen, whose scattering power is insufficient for separate resolution, are clearly seen as circular regions of high electron density, and the peak values enable the separate atoms to be named. As a general rule, it is not possible to obtain the electron density graph without some assistance from chemical evidence, although in some cases the amount of assistance is slight.

Types of Results Obtained

The results obtained may be classified under two heads; first, the qualitative confirmation of organic structures, and the refinement offered by the actual measurement of bond distances, and second, the information obtained with regard to the relative orientation and distance apart of the separate molecules in the crystal.

Bond measurements of organic compounds which can be represented by a unique structural formula show certain definite regularities. Both single and multiple bonds are constant in length, the atoms being nearer in multiple bonded compounds than in single, and nearer in the case of nitrogen atoms than in the case of carbon. Bond distances between carbon and nitrogen atoms are the mean of the corresponding carbon-carbon and nitrogen-nitrogen distances. These regularities are not found where resonance is possible. In such cases, the length of a single bond may have any value intermediate between those normal for single and double bonds. In some of the simpler cases it is possible to estimate bond distances by wave mechanics, and their actual measurement provides a very important check upon these highly involved theoretical calculations. Such measurements also played a very important part in the development of the theory of resonance.

With regard to intermolecular distances in crystals, two groups, normal and abnormal, may also be distinguished. In the first, typified by the hydrocarbons, the molecules appear to be arranged in the most convenient manner, without any particular order, and the distances of nearest approach are of the same order for a great many compounds. In such substances as benzoquinone, as might be expected, the dipole causes some approximation of oppositely charged atoms, but the distance of nearest approach is not greatly reduced. In the second group (abnormal), the approach distances are less by nearly an Angström unit, and this applies generally to those compounds which are known to be associated in the liquid or gaseous states. In the case of resorcinol, for example, very drastic changes are found. The molecules are orientated so that the hydroxyl groups come much nearer to each other than is normal. The structure itself, however, remains open, as is shown by the fact that resorcinol is less dense than benzoquinone. This indicates the strongly directive power of the intermolecular hydroxyl "bonds," which can

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RECENT TRADE LITERATURE

The necessity of ensuring protection from air raids for key men in industry such as switchboard operators, engineers in power houses and boiler-house workers, who are unable to leave their posts, is emphasised in a leaflet issued by CONSTRUCTORS, LTD. This company are the makers of "Consol" portable air raid shelters which are manufactured from heavy bullet-proof steel plate and are claimed to provide protection against splinters, shrapnel, falling masonry and glass. They have been designed for the express purpose of affording protection to key workers, on whose continual presence at their posts depends the safety of other factory workers in cases, for example, where a constant patrol must be maintained on stores of inflammable material to provide an instant check for any possible fire. The shelters have been designed in three sizes, to accommodate one, two or four persons.

T. WHITTLE & SONS, LTD., have introduced a laminated rubber V-belt as an alternative to their well-known "Whittle" link V-belts. The belts, a description of which is contained in a folder issued by the company, can be adjusted to any length, and when joined up are endless. Drives can therefore be arranged to suit any convenient centres and no adjustment for tightening is necessary as the belts can be tightened by the removal of links when required. They are usually run with the broad end of the link in the direction of rotation, but they will run equally well either way and are, therefore, suitable for reversing drives. The belts, the method of construction of which has been adopted after extensive tests, are made in all standard sizes to an angle of 28°, but they can be supplied in any size or angle and to suit any existing pulley grooves. The company have also issued a leaflet giving the revised prices of their flat belting which is made of pure dressed leather, curried in their own works.

In the seventh revised and enlarged edition of *The B.D.H. Book of Reagents for Delicate Analysis*, published by THE BRITISH DRUG HOUSES, LTD. (2s. 6d.), the applications of seventy-two reagents are described. In addition to matter relating to spot-tests as applied to micro-analysis, the book includes adequate working details for many colorimetric determinations and larger-scale methods of analysis in which organic reagents are employed. In recognition of the fact that considerable importance is now attached to the application of certain organic compounds to colorimetric methods of quantitative analysis, the new matter contained in the book is concerned chiefly with this aspect. Most of the original information concerning spot-tests has been retained, and some of the monographs have been substantially amplified by the addition of new methods and applications. Four of the reagents included in the sixth edition have been deleted from the seventh edition because the substances concerned have failed to some extent to satisfy the repeated trials of long experience. Four new reagents have, however, been added to the text. The book now contains 120 pages in place of the previous 100 pages.

(*Continued from preceding column.*)

maintain such an open arrangement. However, when resorcinol is heated above 74° C., thermal agitation destroys this structure, the molecules are arranged without reference to the affinities of the hydroxyl groups, and the density rises. The higher temperature form takes several weeks to revert to the other, and can be studied in the usual way, when it is found that the molecules are arranged in much the same way as in a hydrocarbon crystal. The close approach of hydroxyl groups is very common, and in the case of hydrated oxalic acid, for example, it is thought that intermolecular resonance occurs.

In conclusion, Dr. Robertson said his intention had been to show that the newer developments of X-ray crystallography enabled a definite and accurate picture of the molecular structure to be obtained, the importance of which was evident.

Personal Notes

MR. F. C. WILLIAMS has been elected to the board of British Oil and Cake Mills, Ltd.

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MR. J. HIRST, B.Sc., has been appointed deputy sewage works manager and chemist under Chesterfield Corporation.

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MR. GEORGE LAWSON, a director of J. Hewit and Sons, Ltd., tanners, has left personal estate in Great Britain valued at £69,848.

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SIR WALTER G. KENT, chairman and managing director of George Kent, Ltd., has left estate valued at £54,324 (net personalty £47,233).

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MR. JAMES WILLIAM MCROBERT, a director of Cerebos, Ltd., and of the Middlewich Salt Co., Ltd., has left estate valued at £70,218 (net personalty £66,204).

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MR. ROBERT C. STANLEY, chairman and president of the International Nickel Co. of Canada, has been nominated for a seat on the board of United States Steel.

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MR. JOHN CRAIG, chairman of Colvilles, Ltd., iron and steel manufacturers, Glasgow and Motherwell, has completed 50 years' service with the company, which he joined as an office boy.

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SIR ROBERT LUDWIG MOND, F.R.S., a director of International Nickel of Canada and the South Staffordshire Mond Gas Co. and formerly a director of Brunner, Mond and Co., has left estate valued at £392,964 (net personalty £252,443).

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MR. A. L. HEARN has resigned from the board of the Anglo-Iranian Oil Co., Ltd. He is a director of the D'Arcy Exploration Co., which is actively engaged in seeking for petroleum in various parts of the United Kingdom.

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MR. EDWARD BROTHERTON-RATCLIFFE, late head of Brotherton-Ratcliffe and Co., Ltd., chemical merchants, London, a director of Brotherton and Co., chemical manufacturers, Leeds, and a director of Lysol, Ltd., left gross estate of the value of £96,563 (net personalty £90,640).

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MR. F. MCNEILL, buyer for Joseph Crosfield and Sons, Ltd., soap manufacturers, of Warrington, and for Lever Bros., Port Sunlight, Ltd., has been invited by the Minister of Mines to become a member, to act in lieu of Sir William Noble, of the National Committee of Investigation, and likewise of the North Wales District Committee.

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MR. L. G. W. PALETHORPE, of Newark, a junior chemist with Worthington-Simpson, Ltd., and a part-time student at Nottingham University College, has been awarded the Sir Edward Frankland medal and prize by the Institute of Chemistry for an essay on "Science in industry and the training of industrial chemists, with special reference to the engineering industry."

OBITUARY

PROFESSOR S. P. L. SORENSON, who was a recognised authority in the brewing industry and since 1901 had been director of the chemical department of the Carlsberg lager laboratory in Denmark, died recently in Copenhagen at the age of 71. From 1896 to 1902 he was consulting chemist to the Danish Royal Dockyards. Jointly with Clark, Sorenson introduced a simple means of notation for hydrogen ion concentration which had hitherto been expressed in terms of normality or of gram-equivalents per litre. The usage introduced by the Danish biochemist was to express hydrogen ion concentration in terms of what is called the "hydrogen ion exponent," a number obtained by giving a positive value to the negative power of ten in the expression 1×10^{-n} normal. This hydrogen ion exponent was originally represented by the symbol p_H but now most suitably written pH.

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MR. WILLIAM REID, late of the Glasgow firm of Thomas Reid and Sons, soap manufacturers, died at his home last week.

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MR. DAVID LLOYD HOWARD, a director of Borax Consolidated, Ltd., and vice-chairman and a managing director of Howards and Sons, Ltd., manufacturing chemists, died last week.

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MR. GEORGE WILSON, who held managerial positions with the Bradford Dyers' Association before his retirement in 1919, has died at the age of 91. Mr. Wilson began his business career at the Bowling dyeworks of Edward Ripley and Son, Ltd., in 1863. One of his sons, Mr. Arthur Wilson, is an executive director of the Bradford Dyers' Association and his brothers, Mr. William Wilson and Mr. Joseph Wilson, are directors of the company.

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MR. WILLIAM HENRY STEAD died at his home at Reigate Hill last week at the age of 93. Writing in *The Times* Professor Sir William Pope said that in his early days Mr. Stead was a Liverpool merchant and was, if not wholly at least largely, responsible for the first imports of the soya bean to this country, and its utilisation in industry. Until age made travelling difficult he was a constant attendant at the annual meetings of the British Association. Throughout his long life Stead interested himself in the progress of chemistry and physics and did much in a quiet way to encourage and help his juniors who were engaged professionally or academically in those sciences.

* * * *

MR. E. R. BOLTON, F.I.C., M.I.Chem.E., analyst and consulting chemist, died at his Kensington home last week in his 61st year. Born in Dublin and educated at Bedford and at King's College, London, Mr. Bolton had occupied some notable positions in connection with his profession. After doing valuable work as honorary secretary of the Society of Public Analysts from 1915 to 1925 he was president of the Society from 1926 to 1928. From 1925 to 1928 he was also vice-president of the Institute of Chemistry. From 1927 to 1929 he was a member of the Council of the Chemical Society and was vice-president of the Medico-Legal Society of London. He also gave valuable service to the Imperial Institute as a member of the Advisory Council on Plant and Animal Products, as chairman of the Committee on Oils and Oil Seeds, and as chairman of the sub-committee on Tung Oil; and to the British Standards Institution as a member of the General Council and as chairman of the Committee on Vegetable Oils. He published authoritative books on oils, fats, and fatty foods, and was a prolific contributor of papers to scientific societies and technical journals.

TO-DAY'S ANNIVERSARY

NICOLAI NICOLAJEWITSCH ZININ, Russian chemist, died on February 18, 1880. In 1842 he prepared aniline by the reduction of nitrobenzene with ammonium sulphide, and communicating his discovery to the St. Petersburg Academy he referred to the base as "benzidam." The same product had been obtained in 1826 by Unverdorben, by heating indigo, and he gave it the name of "crystalline." In 1841, von Fritzsche obtained an identical compound from anthranilic acid, produced by the action of caustic alkali on indigo, and he called it "aniline." In 1843 Hofmann showed that these three substances were identical with the base isolated from coal tar, and in his communication to the *Annalen* he preferred to retain the name "aniline."

British Overseas Chemical Trade in January

ACCORDING to the Board of Trade returns for the month ended January 31, 1939, imports of chemicals, drugs, dyes and colours were valued at £1,073,904, an increase of £10,785 as compared with January, 1938. Exports were valued at £1,750,609, as compared with £1,936,790, a decrease of £186,181. Re-exports were valued at £35,931.

Imports

	Quantities. January 31, 1938.	Quantities. January 31, 1939.	Value. January 31, 1938. £	Value. January 31, 1939. £
Acids—				
Acetic .. .. cwt.	7,930	8,873	9,427	10,925
Boric (boracic) .. ,,	3,160	3,340	3,411	3,542
Citric .. .. ,,	2,710	2,050	11,028	8,509
Tartaric .. ,,	1,277	1,339	5,686	6,217
All other sorts .. value	—	—	9,224	6,101
Borax .. .. cwt.	12,650	11,527	7,540	7,315
Calcium carbide .. ,,	109,896	110,296	58,487	48,828
Fertilisers, manufactured tons	1,637	1,592	8,092	7,051
Potassium compounds—				
Caustic and lyes cwt.	8,314	5,543	9,036	7,329
Chloride (muriate) ,,	80,004	43,480	29,723	16,578
Kainite and other potassium fertiliser salts cwt.	52,960	75,924	7,059	9,947
Nitrate (saltpetre) ,,	2,330	6,821	1,994	5,396
Sulphate .. ,,	30,920	7,780	14,342	3,619
All other compounds ,,	8,499	7,373	10,790	10,318
Sodium compounds—				
Chlorate .. .. cwt.	1,634	2,072	1,785	2,254
Chromate and bichromate .. .. cwt.	1,003	1,028	1,314	1,417
Cyanide .. ,,	236	1,420	692	3,052
Nitrate .. .. ,,	55,603	149,984	13,119	37,598
All other compounds ,,	17,921	18,723	21,182	14,305
Chemical manufactures value	—	—	338,461	330,243

	Quantities. January 31, 1938.	Quantities. January 31, 1939.	Value. January 31, 1938. £	Value. January 31, 1939. £
Drugs, medicines and medicinal preparations—				
Manufactured or prepared—				
Quinine and quinine salts .. .. oz.	155,423	132,278	12,836	11,040
Medicinal oils .. cwt.	3,802	6,555	10,993	18,957
Proprietary medicines value	—	—	60,298	65,100
All other sorts .. ,,	—	—	48,163	49,140
Finished dye-stuffs obtained from coal tar cwt.	4,439	3,274	139,835	100,910
Extracts for dyeing ,,	2,619	4,004	5,834	10,806
Extracts for tanning—				
Chestnut .. cwt.	23,612	24,766	16,242	18,244
Quebracho .. ,,	22,330	45,931	20,347	41,743
All other sorts .. ,,	37,491	69,468	32,146	59,381
All other dyes and dye-stuffs .. .. cwt.	1,604	1,307	36,140	18,379
Painters' and printers' colours and materials—				
White lead (basic carbonate) .. cwt.	5,706	4,865	8,289	6,856
Ochres and earth colours cwt.	33,378	50,316	10,458	15,382
Bronze powder and other metallic pigments cwt.	1,231	1,303	8,912	10,408
Carbon blacks .. ,,	30,978	41,080	42,715	54,739
Other pigments and extenders, dry .. cwt.	30,814	44,825	8,816	9,478
Lithopone .. ,,	22,149	17,070	14,195	10,271
All other descriptions ,,	11,021	17,302	24,508	32,535
Total .. .. value	—	—	1,063,119	1,073,904

Exports

Acids—				
Citric .. .. cwt.	2,872	2,264	12,727	10,180
All other sorts .. value	—	—	20,628	16,869
Aluminium compounds tons	2,265	3,376	24,932	44,551
Ammonium compounds—				
Sulphate .. tons	21,623	16,167	145,572	105,804
All other sorts .. ,,	1,600	1,374	19,830	20,389
Bleaching materials—				
Bleaching powder (chloride of lime) .. cwt.	56,291	45,296	13,367	14,663
All other sorts .. ,,	3,102	5,514	8,969	14,682
Coal tar products—				
Cresylic acid .. galls.	196,995	132,522	36,009	15,591
Tar oil, creosote oil ,,	2,709,055	4,338,539	72,451	102,866
All other sorts .. value	—	—	20,315	8,346
Copper, sulphate of tons	2,230	2,541	37,658	42,856
Disinfectants, insecticides, etc. .. .. cwt.	29,047	26,811	55,361	55,773
Fertilisers, manufactured tons	15,127	16,264	74,330	84,297
Glycerine .. .. cwt.	15,331	3,980	61,965	12,732
Lead compounds .. ,,	15,013	10,154	20,605	14,105
Magnesium compounds tons	364	414	9,056	10,331
Potassium compounds cwt.	3,306	4,078	6,870	8,553
Salt (sodium chloride) tons	17,133	17,129	47,279	48,128
Sodium compounds—				
Carbonate, including soda crystals, soda ash and bicarbonate cwt.	317,513	358,208	74,757	80,081
Caustic .. .. ,,	226,730	155,210	128,770	86,540
Silicate (water glass) ,,	27,929	10,638	7,691	3,174
Sulphate, including salt cake .. .. cwt.	32,011	62,850	3,340	7,666
All other sorts .. ,,	40,451	47,331	60,880	60,381

Zinc oxide .. tons	876	1,250	18,927	22,176
All other descriptions value	—	—	193,481	173,686
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. .. oz.	187,558	148,507	20,605	15,503
Proprietary medicines value	—	—	143,516	101,902
All other descriptions ,,	—	—	152,026	155,635
Dyes and dye-stuffs and extracts for dyeing and tanning—				
Finished dye-stuffs obtained from coal tar—				
Alizarine, alizarine red and indigo (synthetic) cwt.	1,357	863	8,973	8,000
Other sorts .. ,,	7,261	5,706	99,296	91,725
Extracts for tanning ,,	19,172	17,325	16,753	14,607
Painters' and printers' colours and materials—				
Ochres and earth colours cwt.	9,851	6,892	10,511	7,903
Other descriptions ,,	5,770	7,571	22,756	26,896
White lead .. ,,	3,408	4,295	7,234	8,219
Ships' bottom compositions .. .. cwt.	2,245	2,229	8,355	7,254
Lithopone .. ,,	12,407	6,922	8,964	5,258
Paints and painters' enamels .. .. cwt.	42,700	37,558	118,624	109,497
Varnish and lacquer (clear) galls.	72,534	59,990	28,642	25,243
Printers' ink .. cwt.	4,850	4,064	24,294	21,361
All other descriptions ,,	39,174	39,961	82,572	80,393
Total .. .. value	—	—	1,936,790	1,750,609

Re-Exports

Chemical manufactures and products .. value	—	—	27,526	19,791
Drugs, medicines and medicinal preparations value	—	—	9,248	13,798
Dyes and dye-stuffs and extracts for dyeing and tanning .. .. cwt.	637	704	1,011	1,522
Painters' and printers' colours and materials value	371	361	896	820
Total .. .. value	—	—	38,681	35,931

General News——From Week to Week

BRISTOL CITY COUNCIL has decided to launch a West of England Industrial Exhibition to take place in the autumn.

GAS FROM THE NEW COKE OVENS at the Stanton Ironworks is to be taken in bulk for use by the Nottingham Gas Department.

AFTER LYING DERELICT for many years the £12,000,000 Gretna war munition factory is to be redeveloped and will again become an important base under the national defence scheme.

THE ANNUAL SAMPLE FAIR AT MILAN will open this year on April 12 and close on April 27. The show of chemical and pharmaceutical products will be housed in a large permanent pavilion with 1,150 sq. m. of available space.

H.M. QUEEN MARY, who has been a patron of the Silk Association for many years, has agreed to extend her patronage to the association after its reconstitution as the Rayon and Silk Association (Incorporated). Lord Derby will be the first president of the new organisation.

THOMAS KERFOOT AND CO., LTD., manufacturing chemists, of Bardsley, entertained their employees to the annual whist drive and dance in the Ashton-under-Lyne Town Hall recently. During the dance interval, Dr. T. H Manners Kerfoot thanked all the employees for their close co-operation during the past twelve months, which had proved a period of some difficulty.

DAMAGE ESTIMATED AT SEVERAL HUNDRED POUNDS was caused by a fire which broke out last week at the Deanhead Chemical Works, Summit, of Michael Uttley & Co., Littleborough, near Rochdale. The central portion of the building was well alight and the roof over the boiler house had collapsed when the fire brigade arrived. The two end sections of the building, which contained valuable machinery and stocks of chemicals, were saved.

IN THE COURSE OF AN ADDRESS to the National Trade Union Club in London on Wednesday, Colonel K. C. Appleyard, chairman of North-Eastern Trading Estates, Ltd., said that the Team Valley Trading Estate was taking its rightful place as an important piece of industrial development; in two years it had attracted no less than 125 industries to the North-East, which could employ some 9,000 people when they worked up to normal production.

ON FEBRUARY 7 LENINGRAD CELEBRATED the 105th anniversary of the birth of D. I. Mendeleyev, the creator of the periodic system of chemical elements. The Leningrad University has arranged a series of lectures on the scientist's work and has opened an exhibition in Mendeleyev's old study at the University. Mendeleyev's study has been converted into a museum, of which his daughter is the curator. She is writing a book of reminiscences entitled "Mendeleyev in His Lifetime," which is to be published shortly.

THE THIRD CONFERENCE ON INDUSTRIAL PHYSICS is being arranged by the Institute of Physics to take place in Leeds from March 23 to 25 next, under the Presidency of Professor R. Whiddington. The subject of the Conference is to be "Physics in the Textile Industries." An exhibition of instruments, apparatus and books cognate to this subject is being arranged and will be held in the Physics Laboratories of the University of Leeds. The programme will include an address by the President of the Institute of Physics, Mr. C. C. Paterson, on "Colour and Colour Rendering," and an address by Dr. C. G. Darwin, Director of the National Physical Laboratory, on "Heat Effects in Fibres and other Systems." In addition, the following lectures, to be followed by discussions, have been arranged: "The Physics of Humidity" by Prof. R. Whiddington; "Industrial Humidity Control and Measurement," by Dr. Ezer Griffiths; "The Contribution of Physics to the Development of Industrial Process Control," by Dr. M. C. Marsh; and "Automatic Regulators for the Textile Industries," by Mr. D. Harrison. Visits to local works and research laboratories will be included in the programme and a Conference dinner is being arranged. There will be no Conference fee and membership is open to all interested. Further particulars may be obtained from the Secretary, The Institute of Physics, 1 Lowther Gardens, Exhibition Road, London, S.W.7.

STAFF MEMBERS AND GUESTS from London, Bristol, Newport, and other towns were present last week at the annual staff dinner dance of the Cardiff works of the British Oxygen Company, Ltd., at Cardiff.

A SURVEY OF THE DIATOMITE DEPOSITS in Skye, which is now concluding, has shown that there are about 30,000 tons of this valuable mineral. The Skye supply is the largest deposit in the British Isles, which has been mainly dependent on its imports. Last year over £115,000 worth was imported from Denmark.

A REPRESENTATION has been made to the Board of Trade under Section 10 (5) of the Finance Act, 1926, regarding dimethylamine. Any communication should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, before March 14, 1939.

DANIEL ADAMSON AND CO., have recently installed two large gas-fired furnaces for the controlled heat treatment of steel plates weighing up to 22 tons, at their Dukinfield works. They are using gas fuel at specially low cost, the supplies having been made possible by the linking up of three neighbouring gas undertakings which were recently acquired by the United Kingdom Gas Corporation.

AT A MEETING ON FEBRUARY 13 of the Glasgow Corporation Gas Sub-Committee on Works and Distribution, it was decided to install a new gas plant at the Provan Gas Works, Glasgow, which will produce 5,000,000 cu. ft. of gas per day and at the same time provide an outlet for the consumption of surplus coke produced by the gas department. The estimated cost of the project is £41,000.

IT IS OFFICIALLY INTIMATED BY COURTAULDS, LTD., that, pending the outcome of negotiations between themselves and British Celanese, Ltd., the viscose and acetate yarn producers, including the above two companies, have made an arrangement concerning prices. It is also stated that the arrangements "should lead to greater stability on a somewhat higher price level than prevails at present."

DR. E. F. ARMSTRONG, F.R.S., will be the speaker at the next informal meeting of the Chemical Club on Monday next, February 20. The title of the talk will be "The Chemist up the Garden." As he is known both to have been a keen gardener and to take an interest in the chemical substances which plants manufacture, Dr. Armstrong is expected to add a little horticultural lore and levity with perhaps a chemical background to the art "of digging weeds from garden paths with broken dinner knives." There will be an informal dinner (with unbroken knives) at 7.0 p.m. and the meeting will start at 8.15.

THE INSTITUTION OF CHEMICAL ENGINEERS announced the following awards on Wednesday:—*Osborne Reynolds Medal.*—To Mr. HUGH BEAVER for "valuable constructive work." Mr. Beaver took a prominent part in the organisation of the Chemical Engineering Congress in 1936. *Moulton Medal.*—Jointly to Dr. J. H. DOBSON and Prof. W. J. WALKER of Johannesburg, for their work on engineering problems associated with the improvement of conditions in mines. *Junior Moulton Medal.*—To Mr. E. F. J. TOMALIN, who has just left for the Dutch East Indies to work in the petroleum industry. *William Macnab Medal.*—Mr. P. E. ROUSSEAU, mining engineer of Johannesburg.

JUDGMENT WAS GIVEN at Chaumont (Upper Marne), France, on Tuesday in an action brought by Imperial Chemical Industries, Ltd., against three French companies, the Philochimie, the C.A.C.I. (Compagnie d'Applications Chimiques à l'Industrie) of Paris, and the Société des Forges in the Upper Marne Department. The plaintiff company alleged that a process patented by it in 1929 for pickling iron and steel castings had been imitated and employed by the defendants. The Court came to the conclusion that the patent was worthless, the process having been made known and used before the patent was taken out, and the plaintiff company was ordered to pay 70,000f. damages to the Société des Forges, 30,000f. to the Philochimie and 10,000f. to the C.A.C.I., in addition to all the costs.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

RECOVERY OF SULPHUR DIOXIDE.—R. F. Bacon. (United States. Jan. 21, '38.) 2144; (United States, Jan. 21, '38.) 2145; (United States, May 18, '38.) 2146.

THERAPEUTIC PREPARATIONS, ETC.—R. Beutner. 2296.

PREPARATION OF USCHARIN, ETC.—E. Boehringer, A. Boehringer, J. Liebrecht, and I. Liebrecht (geb. Boehringer). (Germany, Jan. 22, '38.) 2323.

MAGNESIUM ALLOY.—T. F. Bradbury. 2264.

ELECTROLYTIC POLISHING OF METALS.—Brevets Aero-Mecaniques Soc. Anon. (Belgium, Feb. 10, '38.) 2580.

COLOURATION OF ARTIFICIAL MATERIALS.—British Celanese, Ltd. (United States, Jan. 26, '38.) 2593.

PRODUCTION OF HYDROXY CARBOXYLIC ESTERS.—Consortium für Elektrochemische Industrie Ges. (Germany, Jan. 21, '38.) 2123.

TREATMENT OF TAR ACIDS.—A. F. Craig and Co., Ltd., and R. Gourlay. 2186.

TREATMENT OF ARYL SUBSTITUTED OLEFINES.—Distillers Co., Ltd., H. M. Stanley, and F. E. Salt. 2279.

MANUFACTURE OF MODIFIED POLYMERISED ESTERS of methacrylic acid.—E. I. du Pont de Nemours and Co. (United States, Jan. 26, '38.) 2621.

MANUFACTURE OF MERCAPTANS.—E. I. du Pont de Nemours and Co., and J. E. Cole. 2088.

OXIDATION OF UNSATURATED FATTY ACIDS.—E. I. du Pont de Nemours and Co., and E. K. Ellingboe. 2322.

MANUFACTURE OF LEAD-ALKALI METAL ALLOYS.—E. I. du Pont de Nemours and Co., and H. N. Gilbert. 1915.

PURIFICATION OF RESINS BY DISTILLATION.—Dussek Bros. and Co., Ltd., and A. W. Thompson. 2570.

DIELECTRIC COMPOSITIONS.—Dussek Bros. and Co., Ltd., and A. W. Thompson. 2646.

ALLOYS OF TUNGSTEN, ETC.—General Electric Co., Ltd. (Heraeus Vacuum-schmelze, A.-G.). 2420.

MANUFACTURE OF CONDENSATION PRODUCTS suitable for wetting, etc., purposes.—W. W. Groves (I. G. Farbenindustrie.) (Aug. 6, '37.) 1886.

MANUFACTURE OF SUBSTANCES OF CAPILLARY ACTION.—W. W. Groves (I. G. Farbenindustrie.) (Jan. 25, '38.) 2248, 2249, 2250.

MANUFACTURE OF ESTERS.—W. W. Groves (I. G. Farbenindustrie.) (Sept. 15, '37.) 2251, 2252.

MANUFACTURE OF POLYMERIC NITROGENOUS DERIVATIVES.—W. Harrison. 2383.

MANUFACTURE OF BROMINE COMPOUNDS OF PHYTOL.—F. Hoffman-La Roche and Co., A.-G. (Switzerland, Feb. 11, '38.) 2014.

TREATMENT OF HYDROCARBON RESIDUES.—Houdry Process Corporation and E. J. Houdry. 2271.

MANUFACTURE OF CEMENT and alkali metal aluminate.—I. G. Farbenindustrie. (Germany, Jan. 20, '38.) 1950.

PROCESS FOR REMOVING SILICA FROM MINERALS.—I. G. Farbenindustrie. (Germany, April 8, '38.) 1952; (Germany, July 23, '38.) 1953.

PRODUCTION OF IRON-OXIDE PIGMENTS.—I. G. Farbenindustrie. (Germany, March 25, '38.) 1954.

PRODUCTION OF BERYLLIUM COMPOUNDS which are free from fluorine.—I. G. Farbenindustrie. (Germany, April 5, '38.) 2356.

MANUFACTURE OF ALLOYS.—I. G. Farbenindustrie. (Germany, March 2, '38.) 2498.

PRODUCTION OF BERYLLIUM COMPOUNDS free from fluorine.—I. G. Farbenindustrie. (Germany, April 5, '38.) 2499.

MANUFACTURE OF POLYMERISATION PRODUCTS.—I. G. Farbenindustrie. (Germany, Jan. 24, '38.) 2505.

MANUFACTURE OF CEMENT, ETC.—I. G. Farbenindustrie. (Germany, Feb. 2, '38.) 2506.

MANUFACTURE OF SULPHONIC ACIDS.—I. G. Farbenindustrie. (Germany, Jan. 25, '38.) 2507.

PROCESS FOR THE MANUFACTURE OF AZO-DYESTUFFS.—I. G. Farbenindustrie. (Germany, Jan. 25, '38.) 2657.

PROCESS OF RECOVERING PHOSPHORUS from phosphorus sludge. I. G. Farbenindustrie. (Germany, April 29, '38.) 2658.

NORMALLY SOLID POLYMERS OF ETHYLENE.—Imperial Chemical Industries, Ltd. (Du Pont de Nemours and Co.). 2089.

METHOD OF MAKING FILMS, ETC., of cellulose derivatives.—Kodak, Ltd. 2003, 2004, 2005, 2006.

SEPARATION OF COBALT AND NICKEL.—R. Lant. 2357.

MAKING FROTHS containing hydrocyanic acid.—L. Lowenstein. (Germany, Feb. 14, '38.) 2565; (Germany, May 9, '38.) 2566; (Germany, May 31, '38.) 2567.

MANUFACTURE OF ARTIFICIAL ASBESTOS.—W. Ludke. 2453.

PRODUCTION OF PROTECTIVE COATINGS on magnesium, etc.—Magnesium Elektron, Ltd. (Germany, Feb. 2, '38.) 2659.

PRODUCTION OF ALLOYS.—Mallory Metallurgical Products, Ltd. (Mallory and Co., Inc.). 2615.

CHEMICAL MANUFACTURE.—Mathieson Alkali Works (United States, Dec. 29, '38.) 2336.

HARD METAL ALLOYS.—Matol, Ltd., and F. Sellman. 2051.

PRODUCTION OF PURE ALUMINA, etc., from the ash, etc., resulting from the combustion of pulverulent, etc., carbonaceous materials.—F. G. Mitchell, and J. E. Temple. 2262.

PRODUCTION OF NICKEL STRIP from nickel cathodes.—Mond Nickel Co., Ltd. (United States, Feb. 4, '38.) 2475.

MANUFACTURE OF STABLE PREPARATIONS containing ergometrine, etc.—Naamlooze Vennootschap Orgachemia, and A. Salomon. (Sept. 22, '38.) 2065.

ELECTROLYTIC PROCESSES, ETC.—J. S. Nachtman. (United States, Jan. 25, '38.) 2237.

PREPARATION OF ISOPHORONES.—Röhm and Haas Co. (United States, March 17, '38.) 2238.

METHOD OF PROTECTING ALKALI CYANIDES.—J. H. Schmitt. 2444.

MANUFACTURE OF HIGH MOLECULAR SULPHUR-CONTAINING CONDENSATION PRODUCTS.—Silesia, Verein Chemischer Fabriken. (Germany, Feb. 1, '38.) 2053.

MANUFACTURE, ETC., OF CONDENSATION PRODUCTS.—Soc. of Chemical Industry in Basle. (Switzerland, Jan. 22, '38.) 2127; (Switzerland, April 14, '38.) 2128; (Switzerland, Aug. 12, '38.) 2129; (Switzerland, Jan. 3.) 2130. (Switzerland, Jan. 22, '38.) 2131; (Switzerland, April 14 '38.) 2132; (Switzerland, Aug. 12, '38.) 2133; (Switzerland, Jan. 3.) 2134.

TREATMENT OF HYDROCARBONS.—Texaco Development Corporation. (United States, Feb. 17, '38.) 2436.

CATALYTIC REACTIONS.—A. Wassermann. 2622.

PLASTIC COMPOSITION.—C. P. Winslow. (United States, Jan. 28, '38.) 2056.

PRODUCTION OF TOLUOLE.—Woodall-Duckham (1920), Ltd., and H. M. Spiers. 1991.

Complete Specifications Open to Public Inspection

PROCESS FOR THE MANUFACTURE OF ALLOYS, in particular of ferro-alloys or inoxidisable steels.—Soc. D'Electrochimie, D'Electrometallurgie, et des Acieries Electriques D'Ugine. July 22, 1937. 20825/38.

PROCESS FOR THE MANUFACTURE OF PRODUCTS with foaming, emulsifying, and wetting properties.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. July 21, 1937. 20835/38.

PROCESS FOR THE MANUFACTURE OF REACTION PRODUCTS from aromatic hydrocarbons.—I. G. Farbenindustrie. July 17, 1937. 20933/38.

METHOD OF AND APPARATUS FOR ANALYSING GASEOUS MIXTURES.—Soc. Francaise des Regulateurs Universels Arca, and R. J. Sirretta. July 23, 1937. 21092/38.

CONTINUOUS PRODUCTION OF GLASS having a plurality of layers. Neue Glasindustrie-Ges. July 19, 1937. 21142/38.

PROCESS OF TREATING TEXTILES.—Rohm and Haas Co. July 23, 1937. 21181/38.

IMPROVING THE RESISTANCE OF METALS to corrosion.—Pyrene Co., Ltd. July 20, 1937. 21201/38.

MANUFACTURE OF POLYOXY COMPOUNDS of the cyclopentanopolyhydrophenanthrene series and derivatives thereof.—Soc. of Chemical Industry in Basle. July 17, 1937. 21249/38.

MANUFACTURE OF DERIVATIVES of the saturated and unsaturated cyclopentanopolyhydrophenanthrene series.—Soc. of Chemical Industry in Basle. July 19, 1937. (Cognate Application, 21253/38.) 21252/38.

MANUFACTURE OF ESTERS of diphenylene-acetic acid.—Soc. of Chemical Industry in Basle. July 21, 1937. 21254/38.

STABILISATION OF PLASTIC POLYMERS of halogenobutadienes.—E. I. du Pont de Nemours and Co. July 17, 1937. 21300/38.

MANUFACTURE OF CYCLIC KETONES of the saturated and unsaturated cyclopentanopolyhydrophenanthrene series.—Soc. of Chemical Industry in Basle. July 22, 1937. 21404/38.

PRODUCTION OF FORMAMIDE DERIVATIVES.—E. I. du Pont de Nemours and Co. July 22, 1937. 21449/38.

MANUFACTURE OF SYNTHETIC RUBBER.—Instituto Per Lo Studio Della Gomma Sintetica. July 19, 1937. 21459/38.

METHOD OF PREPARING PARA-*N*-SUBSTITUTED DIARYL-SULPHOXIDES.—Laboratoires Francais de Chimiotherapie, and A. Girard. July 20, 1937. 21524/38.

INTRAMOLECULAR DEHYDROGENATION OF AROMATIC NUCLEI.—Soc. of Chemical Industry in Basle. July 23, 1937. 21545/38.

CATALYST AND PROCESS for the catalytic preparation of liquid hydrocarbons by reduction of carbon monoxide.—A. M. C. M. Luyckx. July 20, 1937. 21548/38.

FORMATION OF CHROMIUM-CONTAINING LAYERS on ferrous surfaces.—K. Daeves, G. Becker, and F. Steinberg. July 21, 1937. 21593/38.

PREPARATION OF AMINO ALCOHOLS.—Chemical Works, formerly Sandoz. July 21, 1937. 21595/38.

PROCESS FOR THE MANUFACTURE OF DYESTUFFS of the anthraquinone series.—I. G. Farbenindustrie. July 20, 1937. 21603/38.

MANUFACTURE OF CHLORINE and alkali metal nitrates.—Imperial Chemical Industries, Ltd. July 21, 1937. 21606/38.

MANUFACTURE OF SYNTHETIC RUBBER.—Istituto Per Lo Studio Della Gomma Sintetica. July 21, 1937. 21675/38.

ALLOYS SUITABLE FOR USE AS BEARING-METALS.—P. Kemp. July 21, 1937. 21699/38.

PREPARATION OF TECHNICALLY VALUABLE CHLORINATED HYDROCARBONS.—Rohm and Haas, A.-G. July 22, 1937. 21822/38.

PRODUCTION OF CAPILLARY ACTIVE SUBSTANCES.—Deutsche Hydrierwerke, A.-G. July 23, 1937. 21956/38.

SOLVENT TREATMENT OF OILS. Standard Oil Development Co. Aug. 3, 1937. 13371/38.

TREATMENT OF ZEIN.—International Patents Development Co. Aug. 2, 1937. 17433/38.

REDUCING CHROMIUM HALIDES.—Great Western Electro-Chemical Co. Aug. 3, 1937. 17857/38.

CATALYSIS.—Houdry Process Corporation. Aug. 5, 1937. 19285/38.

CARBOXYLATION OF ALKALI METAL SALTS OF PHENOLS.—Calco Chemical Co., Inc. July 31, 1937. 20654/38.

OBTAINING HYDROCARBON OILS from solid coals.—A. Pott, and H. Broche. Aug. 4, 1937. 22000/38.

BLEACHING ARTIFICIAL TEXTILE FIBRES and products prepared therefrom.—Deutsche Gold- und Silber Scheideanstalt Vorm. Roessler. Aug. 6, 1937. 22222/38.

STEROL COMPOUNDS and processes for preparing same.—Parke, Davis, and Co. Aug. 6, 1937. 22223/38.

SEPARATION AND PURIFICATION OF CARBONYL COMPOUNDS obtainable by side-chain degradation of steroids.—Soc. of Chemical Industry in Easle. Aug. 4, 1937. 22348/38.

MANUFACTURE OF AMINOARYL SULPHONES.—J. R. Geigy, A.-G. July 31, 1937. 22646/38.

SYNTHESIS OF HIGHER ALIPHATIC HYDROCARBONS.—Studien-und Verwertungs-Ges. July 31, 1937. 22734/38.

METHOD OF PREPARING EMULSIONS for the bleach-out process.—Kodak, Ltd. July 31, 1937. 22845/38.

STABILISING CELLULOSE ESTERS.—Afag Finanzierungs, A.-G. July 31, 1937. 22861/38.

RECOVERING ALUMINA.—J. C. Seailles, and W. R. G. Dyckerhoff. Aug. 2, 1937. 22862/38.

RENDERING FIBROUS MATERIAL WATERPROOF or water-repellent. I. G. Farbenindustrie. Aug. 2, 1937. 22882/38.

PRODUCTION OF PIGMENTED BASES for the production of lacquers, plastics, and the like.—Binney and Smith Co. Aug. 2, 1937. 22889/38.

PRODUCTION OF DYESTUFF PREPARATIONS.—I. G. Farbenindustrie. Aug. 3, 1937. 22940/38.

Specifications Accepted with Date of Application

PLANT FOR THE RECOVERY OF COMMERCIAL BENZENE (benzol), toluol and like products from coal gas, with the purification of coal gas from sulphur, gums, and gum-forming organic compounds.—T. O. Wilton, and H. C. Mann. July 22, 1937. 499,332.

MANUFACTURE OF PRESSED SHAPES of thermoplastic material.—E. W. Fawcett, R. O. Gibson, M. W. Perrin, J. G. Paton, E. G. Williams, and Imperial Chemical Industries, Ltd. July 22, 1937. 499,333.

AZO COMPOUNDS.—E. I. du Pont de Nemours and Co. July 22, 1936. 499,335.

MANUFACTURE AND PRODUCTION OF ALIPHATIC POLYHYDROXY COMPOUNDS of high molecular weight.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 25, 1937. 499,049.

MANUFACTURE OF AZO DYESTUFFS on the fibre.—E. I. du Pont de Nemours and Co. July 22, 1936. 499,336.

POLYVINYL ACETAL RESINS.—Carbide and Carbon Chemicals Corporation. Aug. 29, 1936. 499,339.

ELECTRODEPOSITION OF METALS.—E. I. du Pont de Nemours and Co., H. J. Barrett, and C. J. Wernlund. July 23, 1937. 499,343.

MANUFACTURE OF WHITE TITANIUM PIGMENTS.—Titan Co., Inc. Aug. 26, 1936. 499,153.

MANUFACTURE OF TITANIUM PIGMENTS.—British Titan Products Co., Ltd., A. G. Oppegaard, and R. W. Anerum. Sept. 18, 1937. 499,228.

RESINOUS COMPOSITIONS and methods of making the same.—British Thomson-Houston Co., Ltd. Dec. 4, 1936. 499,065.

CONVERSION OF NORMALLY GASEOUS HYDROCARBONS into hydrocarbon liquids.—Universal Oil Products Co. Aug. 21, 1937. 499,066.

IRON DESULPHURISATION.—R. P. Heuer. Feb. 1, 1937. (Divided out of 499,302.) 499,350.

PRODUCTION OF UNSATURATED KETONES.—Naamlooze Vennootschap De Bataafsche Petroleum Maatschappij. April 6, 1937. 498,973.

LOADING EMULSIONS OF HYDROCARBONS with fillers.—Soc. Anon La Route, and M. Poncel. May 13, 1937. 499,352.

PRODUCTION OF RESINOUS CONDENSATION PRODUCTS.—J. E. Pollak (Bergwerksveband zur Verwertung von Schutzrechten der Kohlentechnik). April 28, 1938. 499,091.

AVOIDING DEPOSITIONS OF CARBONATES from water.—F. Hahn. Jan. 4, 1938. 499,247.

PROCESS FOR THE MANUFACTURE OF 2,4-dioxo-3, 3-dialkyltetrahydro-pyridine-6-carboxylic acid esters or the corresponding free acids.—F. Hoffman-La Roche and Co., A.-G. Aug. 25, 1937. 499,256.

PURIFICATION OF GAS OIL which has served for the recovery of benzol from gas resulting from the carbonisation of coal.—Coppee Co. (Great Britain), Ltd., and G. Mostart. June 9, 1938. 499,354.

PRODUCTION OF GAS by distillation or gasefication of fuels of varying lump size.—Didier-Werke, A.-G. Oct. 20, 1937. 499,018.

POLYVINYL ACETAL RESINS.—Kodak, Ltd. (Eastman Kodak Co.). July 15, 1937. 499,184.

MANUFACTURE AND PRODUCTION OF WETTING AGENTS.—G. W. Johnson (I. G. Farbenindustrie.) April 9, 1937. (Samples furnished.) 499,130.

TREATING TEXTILES and oils therefor.—Lister and Co., Ltd., and W. Garner. April 20, 1937. 499,371.

AQUEOUS EMULSIONS OF NITRO-CELLULOSE and processes for manufacturing the same, and paper products treated with the same.—A. King. April 27, 1937. 499,858.

CREASE-RESISTING TREATMENT OF TEXTILE MATERIALS.—A. E. Roberts, and W. Watkins. May 1, 1937. 500,184.

Chemical and Allied Stocks and Shares

OWING to the small amount of business passing on the Stock Exchange the industrial and other sections of the stock and share market were moderately reactionary this week. Nevertheless, the tendency was for the more active securities to attract buyers on any decline in price and most shares of companies associated with the chemical and allied trades have been fairly well maintained on balance.

* * * *

Imperial Chemical fluctuated, but are 31s. 3d. at the time of writing, compared with 30s. 10½d. a week ago, and it is pointed out that on the basis of a dividend of 8 per cent., which the market remains hopeful may be paid for the past year, the yield at the current price would compare very favourably with yields on most other leading industrial shares. British Aluminium at 53s. 9d. have lost the improvement shown a week ago, and rather lower prices also ruled for Murex and Turner and Newall. On the other hand, Fison Packard and Prentice were again a very steady feature around 38s. 9d., and Lever and Unilever were slightly better at 33s. 6d.

* * * *

British Oxygen at 71s. 3d. held the rally shown last week, but fluctuated moderately. Tube Investments were fairly well maintained, but Stewarts and Lloyds, Dorman Long, Consett Iron and most other iron, steel and allied securities lost part of their recent gains. Colvilles and Baldwins were relatively steady on continued market hopes that the forthcoming dividends may be maintained. Firth and John Brown shares were also assisted by the view that the dividend may be unchanged. Enfield Rolling Mills shares came into demand at one time on the assumption that the upward trend in profits may be continued and that there is a possibility of a maiden distribution to shareholders later in the year. Imperial Smelting were less active but have kept around 11s. 6d. at the time of writing.

* * * *

Pinchin Johnson had a somewhat firmer tendency around 26s. The market is assuming that, although a lower dividend may be paid, at least 15 per cent. will be forthcoming for the past year. International Paint and Indestructible Paint shares were steady. In these cases the disposition is to assume that dividend rates are likely to be the same as for the previous year. Cement manufacturers' shares were less active, but have held last week's rise fairly well, and Associated Cement at 70s. are unchanged on balance, sentiment having been influenced by the probability that demand for cement will be stimulated in view of A.R.P. developments. British Plaster Board improved 1s. to 26s. 9d. The company's offer to shareholders of D. Anderson and Son has now been implemented.

* * * *

Boots Pure Drug were fairly steady and at 39s. 9d. are within 6d. of the price current a week ago. Sangers were higher at 21s., while Timothy Whites and Taylors were maintained at 25s. and British Drug Houses were around 21s. Borax Consolidated at 22s. 9d. are slightly higher, partly owing to the hopeful views as to trading prospects contained in the directors' report. British Oil and Cake Mills preferred ordinary were fairly well maintained at 41s. 6d., and a slightly higher price ruled for United Premier Oil and Cake ordinary shares.

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"Shell," Anglo-Iranian and other leading oil shares were inclined to react, and a reduced price was made by London and Thames Haven Oil shares. On the other hand, Mexican Eagle were not active.

Weekly Prices of British Chemical Products

STEADY conditions continue to prevail in the industrial chemical market this week and reports from most sections indicate a good volume of inquiry for items normally enjoying a regular call. Solvents continue to be in good demand, but only a fair interest is displayed in Tartaric and Citric Acids. There are no important price changes to record for general chemicals, rubber chemicals and wood distillation products and quotations on the whole remain steady with a firm undertone. The trade in Coal Tar products has shown a steady improvement, and nearly all directions report a better inquiry for spot or near delivery transactions. The market is still looking for long term business, but it is generally felt that some improvement in this direction will be noticeable in the near future. Prices remain steady and unchanged at recent levels.

MANCHESTER.—New business in chemical products on the Manchester market during the past week has continued on a moderate scale, and most of the transactions have related to relatively small parcels for early delivery. Fair quantities of the bread-and-butter lines of chemicals, however, are being called for against contracts, and in one or two directions the tendency has been a trifle better in this respect. Sulphate of copper has reacted a little in sympathy with the metal, but in most other directions prices have been maintained. Among the by-products pitch is slow and not too strong, and quiet conditions are reported in carbolic and cresylic acids. Toluol and solvent naphtha, however, are steady and in fair request.

GLASGOW.—Business in general chemicals has remained very quiet during the week, both for home trade and export. Prices generally continue quite steady at about last week's figures, with no important changes to report.

Price Changes

Rises: Mercury Compounds.

Falls: Chrometan, crystals; Copper Sulphate (Manchester); India-rubber Substitutes, white and dark; Benzol, crude (Manchester); Creosote (Manchester); Calcium Acetate, grey.

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks

AMMONIUM CHLORIDE.—Grey, £17 10s. per ton, d/d U.K. Fine white, 98%, £16 per ton, d/d U.K.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8½d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contract. SCOTLAND: £9 5s. per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4½d. per lb. d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 2⅝d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—9d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0½d. per lb. MANCHESTER: 1s. 0½d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £18 17s. 6d. per ton f.o.b. SCOTLAND: £19 10s. per ton, less 5%, Liverpool in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £3 17s. 6d. to £4 17s. 6d. per cwt. according to quantity; in drums, £3 10s. 0d. to £4 2s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £29 10s.; brown, £1 per ton less. MANCHESTER: White, £31; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £30 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £30 per ton, less 2½ %, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton. SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 6s. 5d. per lb.; powder B.P., 6s. 7d.; bichloride B.P. (corros. sub.), 5s. 8d.; powder B.P. 5s. 4d.; chloride B.P. (calomel), 6s. 5d.; red oxide cryst. (red precip.), 7s. 6d.; levig., 7s.; yellow oxide B.P. 6s. 10d.; persulphate white B.P.C., 6s. 7d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. 6d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. SCOTLAND: 5½d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9½d. to 10½d. per lb. SCOTLAND: B.P. Crystals, 10½d. MANCHESTER: B.P. 9½d. to 11½d.

POTASSIUM PRUSSIATE.—5½d. to 6d. per lb. SCOTLAND: 6¾d. net, in casks, ex store. MANCHESTER: Yellow, 6d. to 6½d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d per ton, d/d address in barrels. Dog-tooth crystals, £35 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 8s. 6d. per ton.

SODA ASH.—Light, 98/100%, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, 13s. 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags in 1-ton lots. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 15s.

SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.

SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts.

SODIUM CHROMATE.—4½d. per lb. d/d U.K.
4d. per lb. GLASGOW: 4½d. net, carriage paid.

SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.

SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags

SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 0d. per cwt. in 1-cwt. kegs, net, ex store.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.

SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.

SODIUM PRUSSIATE.—4d. per lb. for ton lots. GLASGOW: 4d. MANCHESTER: 4½d. to 5d.

SODIUM SILICATE.—£8 2s. 6d. per ton.

SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 10s.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.

SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

TARTARIC ACID.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1½d. per lb., 5%, ex store.

ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARYTES.—£6 to £6 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 0d. to 3s. 3d. per lb.

CARBON BLACK.—3¾d. to 4 1/16d. per lb., ex store.

CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.

CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 10½d. to 11½d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5d. per lb.; dark 3¾d. to 4¾d. per lb.

LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.

SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.

SULPHUR CHLORIDE.—5d to 7d. per lb., according to quantity.

VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.

ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1939; November, £7 8s.; December, £7 9s. 6d.; January, 1939; £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1939; November, £7 12s. 6d.; December, £7 13s. 9d.; January, 1939, £7 15s.; February, £7 16s. 3d.; March, £7 17s. 6d.; April/June, £7 18s. 9d.

NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1939.

SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1939.

CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. MANCHESTER: Pure, 1s. 8d. to 1s. 8½d. per gal.; crude, 11½d. per gal.

CARBOLIC ACID.—Crystals, 6¾d. to 7¼d. per lb., small quantities would be dearer; Crude, 60's, 1s. 7½d. to 1s. 10d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.

CREOSOTE.—Home trade, 3½d. per gal., f.o.r. makers' works; exports 6d. to 6½d. per gal., according to grade. MANCHESTER: 3d. to 4¼d. GLASGOW: B.S.I. Specification, 6d. to 6¼d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5¾d. to 6¼d.

CRESYLIC ACID.—97/99%, 1s. 5d. to 1s. 8d.; 99/100%, 1s. 9d. to 2s. 6d. per gal., according to specifications; Pale, 99/100%, 1s. 7d. to 1s. 9d.; Dark, 95%, 1s. 3d. to 1s. 4d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 1s. 9d.

NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. MANCHESTER: 90/160%, 1s. 5d. to 1s. 7d. per gal. GLASGOW: Crude, 6½d. to 7½d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £4 10s. to £5 10s. per ton; purified crystals, £10 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £11 10s. to £13 per ton f.o.b.

PITCH.—Medium, soft, 30s. per ton, f.o.b. MANCHESTER: 28s. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

PYRIDINE.—90/140%, 12s. to 13s. 6d. per gal.; 90/160%, 10s. to 11s. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 11s. to 13s. 6d. per gallon.

TOLUOL.—90%, 1s. 11d. per gal.; pure 2s. 3d. GLASGOW: 90% 120, 1s. 10d. to 2s. 1d. per gal. MANCHESTER: Pure, 2s. 3d. per gallon, naked.

XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 3d. to 2s 3½d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 to £8 5s. MANCHESTER: Brown, £8 10s.; grey, £10.

METHYL ACETONE.—40.50%, £32 to £35 per ton.

WOOD CREOSOTE.—Unrefined, 6d. to 8d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—2s. 8d. to 3s. per gal.; solvent, 3s. to 3s. 5d. per gal.

WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.

BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESOL 30/31° C.—6½d to 7½d. per lb. in 1-ton lots.

p-CRESOL, 34.5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.

DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.

DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.

GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works

H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.

NAPHTHIONIC ACID.—1s. 10d. per lb.

β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.

α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.

β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.

NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.

o-NITRANILINE.—4s. 3½d per lb.

m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 10d. to 1s. 11d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works

o-TOLUIDINE.—10¾d. per lb., in 8/10 cwt. drums, drums extra.

p-TOLUIDINE.—1s. 10½d. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ELEPHANT CHEMICAL CO., LTD., London, S.E. (M., 18/2/39.) February 2. £3,000 debentures; general charge, *£7,750. September 30, 1938.

Satisfactions

BUCKLEY-BOWKER TABLET CO., LTD., London, N., manufacturers of medicinal and food tablets. (M.S., 18/2/39.) Satisfaction February 3, of debentures registered June 18, 1926.

ELEPHANT CHEMICAL CO., LTD., London, S.E. (M.S., 18/2/39.) Satisfaction February 2, £1,000, registered October 21, 1938.

Company Winding-up Voluntarily

NITH DYEING AND FINISHING CO., LTD. (C.W.U.V., 18/2/39.) February 6 (members). H. J. Rigg, 22 Lowther Street, Carlisle, appointed liquidator.

Declaration of Solvency Filed

CONSOLIDATED PHARMACEUTICALS, LTD., Welwyn Garden City. (D.S.F., 18/2/39.) February 2.

Receiverships

BASSETT AND ROBERTS, LTD., London, E.C., oil refiners and distributors. (R., 18/2/39.) P. N. Goode has ceased to act as receiver and manager. February 6.

Company News

Bovril, Ltd., report a profit of £251,238 (£281,964) for 1938.

Aspro have declared an interim dividend of 10 per cent. (same).

Fairy Dyes, Ltd., report a trading loss for the year of £8,447. The full 7½ per cent. has been paid on the Preferred shares.

R. Cruickshank, Ltd., chemical manufacturers, etc., have increased their nominal capital by the addition of £20,000 beyond the registered capital of £30,000.

Electrolytic Chemical Products, Ltd., have increased their nominal capital by the addition of £14,000 beyond the registered capital of £2,000.

Paripan, Ltd., report that the net profit for the past year was £12,365 (against £9,448). A final dividend of 15 per cent., making 30 per cent. (same) has been declared.

British Lead Mills, Ltd., who report a net profit for the year to October 31 of £23,771, have declared a final dividend of 10 per cent., making 20 per cent. (same).

Eastwoods Cement, Ltd., have repeated their interim dividend on the Ordinary shares for 1938-39 at the same rate as in the four preceding years—5 per cent., less tax.

F. W. Hampshire and Co., report a fall in net profits of £10,209, to £67,237, in 1938. Trading profits declined from £105,407 to £89,165, and total income from £109,377 to £93,046. Tax and N.D.C. absorbs £16,114, or £6,626 less than in the preceding year, and £7,392 (£6,876) is deducted for depreciation.

Borax Consolidated, Ltd., report a profit of £405,284 (£486,232) for the year ended September 30 last. The directors propose to place £30,000 to income tax reserve and N.D.C. and £5,000 to pensions and grants fund, leaving, after the payment of dividends, etc., a carry forward of £241,527.

Monsanto Chemicals, Ltd., report a fall in trading profits from £219,585 to £199,840 in 1938. Total income is £19,659 down at £204,254. Depreciation and obsolescence takes £41,202 (£37,770), and tax and N.D.C. £54,144 (£53,341). The year's dividend is repeated at 33⅓ per cent., tax free. A sum of £16,000 is reserved against a trade investment, and £196,789 goes forward, compared with £219,969 brought in.

The Bradford Dyers' Association have announced a trading loss for 1938 of £240,449, after charging £143,891 for depreciation. For 1937, a trading profit of £29,018 was made after providing £150,097 for depreciation. Interest on Debenture stock absorbs £58,150, making the total loss for the year £298,599. The directors have decided to transfer £150,000 from reserve, leaving a debit of £137,227 to go forward, compared with a credit of £11,372 brought in.

Amalgamated Oxides, Ltd., propose to place the company in voluntary liquidation.

South Staffordshire Mond Gas Co. state that the gross profit for the year ended December 31 was £23,517, and after deducting prior lien and debenture stock interest there was a net profit of £10,601. To this is added £22,680 brought forward. The directors recommend a dividend of 1½ per cent., less tax, on ordinary shares (against 2½ per cent.).

Courtaulds, Ltd., announced that profits for 1938 amounted to only £352,265, compared with £2,373,892 for 1937. The total ordinary dividend is reduced from 10½ per cent. to 4 per cent., less tax, the final payment recommended being 2½ per cent. The sum of £296,641 was brought in. Preference and ordinary dividends required £986,000, and £284,844 is carried forward. A sum of altogether £621,938 has been taken from reserves.

Forthcoming Events

London.

February 20-March 3.—British Industries Fair. London: Olympia and Earl's Court. Birmingham: Castle Bromwich.

February 20 and 27.—Royal Society of Arts. John Street, Adelphi, W.C.2. 8 p.m. Sir Gilbert T. Morgan, "Achievements of British Chemical Industry in the Last 25 Years."

February 20, 22 and 24.—University of London. Bedford College for Women, York Gate, Regents Park, N.W.1. 5.15 p.m. Professor Franz Simon, "The Present Position and Future Objective of Low Temperature Research."

February 20.—Chemical Club. 2 Whitehall Court, S.W.1. 8.15 p.m. Dr. E. F. Armstrong, "The Chemist up the Garden."

February 21.—Northampton Polytechnic. St. John Street, E.C.1. 8 p.m. S. Wernick, "A Decade of Progress in the Electro-Deposition of Metals: Bright Metal Deposits."

February 23.—Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C.3. 7 p.m. S. Judd Lewis, "Spectroscopic Analysis."

Royal Institution, 21 Albemarle Street, W.1. 5.15 p.m. Dr. C. G. Goodeve, "Photochemistry."

February 25.—Royal Institution, 21 Albemarle Street, W.1. 3 p.m. Sir William Bragg, "Crystals of Organic Substances."

March 1.—Society of Public Analysts, Burlington House, Piccadilly, W.1. 8 p.m.

Birmingham.

February 23.—Society of Chemical Industry, Chamber of Commerce Buildings, New Street. 7.30 p.m. Joint meeting with the Road and Building Materials Group. D. W. Parkes and H. C. Bennett, "A New Method of Testing the Durability of Bituminous Road Binders."

February 27.—Chemical Society, Joint meeting with the Birmingham University Chemical Society, The University, Edgbaston. 5 p.m. Professor E. L. Hirst, "The Molecular Structure of Starch."

Leeds.

February 28.—Chemical Society, Society of Chemical Industry, Institute of Chemistry. Joint meeting with the Leeds University Chemical Society. K. McLennan, "The Production and Utilisation of Cod Liver Oil," and L. Anderson, "The Manufacture of Fine Chemicals."

Manchester.

February 22.—Textile Institute (Lancashire Section). Literary and Philosophical Society Rooms, 36 George Street. 7.30 p.m. J. Guild, "Colour."

February 24.—Literary and Philosophical Society, Chemical Section, 36 George Street. 7 p.m. J. M. Faulds, "Starch: Its Extraction, Modifications and Applications."

Newcastle.

February 23.—Bedson Club. King's College. 6.30 p.m. Dr. Olaf F. Bloch, "Some Scientific and Technical Applications of Photography."

Sheffield.

February 22.—Institute of Metals. Sheffield University. St. George's Square. 7.30 p.m. C. H. Desch, "Metals of High Purity."

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Norway.—An agent established at Bergen wishes to obtain the representation of United Kingdom manufacturers of sulphate of copper for Norway. (Ref. No. 98.)

Roumania.—A firm in Bucharest wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers and exporters of dyestuffs and chemicals, etc., for textile industries. (Ref. No. 101.)

Sweden.—An agent established at Gothenburg wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of paint, chemicals, for Sweden. (Ref. No. 102).